

### Little Brown Bat

Risk to the insectivorous bat from detected COC concentrations in lagoon sediments and from estimated concentrations in aquatic invertebrates are presented in Table 29. The total mean ESQs for the NOAEL and LOAEL TRVs are 230 and 23, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxins (ESQ is 17), aroclor 1248 (ESQ is 3) and aluminum (ESQ is 2). Dioxins provide nearly 75 percent of the total risk to the little brown bat based on the chronic LOAEL TRV. Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxins (ESQ is 170), aluminum (ESQ is 24), cadmium (ESQ is 3), silver (ESQ is 1), aroclor 1242 (ESQ is 2), aroclor 1248 (ESQ is 26) and aroclor 1254 (ESQ is 1). Dioxins provide nearly 75 percent of the total risk based on the chronic NOAEL TRV with aluminum and aroclor 1248 providing nearly all the remaining risk.

The mean and maximum concentrations of aluminum within the reference pond sediment samples are greater than detected within the lagoon sediments. Therefore, risk from aluminum is no greater than background risk. Although the estimated exposure dose for aroclor 1248 exceeds both the NOAEL and LOAEL TRVs, it should be noted that this COC was only detected in one lagoon sediment sample. Therefore, actual risk from exposure to aroclor 1248 by foraging bats may be somewhat overestimated. Dioxins appear to present the greatest risk to insectivorous mammals foraging above the lagoons as the mean estimated exposure doses exceed both the chronic NOAEL and LOAEL by a substantial margin and detected dioxin concentrations exceed concentrations detected in the reference pond (as well as within the upgradient Hoosic River sediment samples).

### Mallard

Risk to the omnivorous mallard from detected COC concentrations in lagoon surface water and sediments (as well as modeled concentrations in aquatic vegetation and invertebrates) are presented in Table 30. The total mean ESQs for the NOAEL and LOAEL TRVs are 2 and 0.4, respectively. No COCs have a mean ESQ above unity for the LOAEL TRV while only the mean chromium exposure dose of chromium (ESQ is 2) exceeds unity when compared to the NOAEL TRV. Although the mean chromium dose received by the mallard exceeds its respective NOAEL TRV and may result in risk, there is considerable uncertainty as the exposure dose is less than the reported LOAEL TRV.

### Raccoon

Risk to the raccoon from modeled COC concentrations of aquatic vegetation and invertebrates as well as from the ingestion of contaminants present in surface water and sediment are presented in Table 31. The total mean ESQs for the NOAEL and LOAEL TRVs are 29 and 3, respectively. Mean estimated exposure doses of dioxins and aluminum received by the raccoon were slightly above the chronic LOAEL TRV (ESQ is 1 for both COCs). The mean estimated exposure doses of dioxins (ESQ is 12), aluminum (ESQ is 14), and aroclor 1248 (ESQ is 2) exceed the chronic NOAEL TRV.

**Table 29. Little Brown Bat Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.65E-04	5.80E-04	1.7E+02	5.8E+02	1.7E+01	5.8E+01
Aluminum	1.93	19.3	4.57E+01	6.04E+01	2.4E+01	3.1E+01	2.0E+00	3.1E+00
Antimony	0.143	1.43	6.59E-02	4.40E-01	5E-01	3.E+00	5.E-02	3.E-01
Arsenic	4.6	9.3	7.48E-02	1.20E-01	2.E-02	3.E-02	8.E-03	1.E-02
Barium	5.1	-	5.39E-01	9.33E-01	1.E-01	2.E-01	-	-
Beryllium	0.66	-	1.96E-02	3.64E-02	-	-	-	-
Cadmium	1	10	2.64E+00	5.53E+00	3.E+00	6.E+00	3.E-01	6.E-01
Chromium	2737	-	1.11E+02	2.65E+02	4.E-02	1.E-01	-	-
Cobalt	-	-	1.32E-01	1.60E-01	-	-	-	-
Copper	11.7	15.14	7.24E+00	1.15E+01	6.E-01	1.E+00	5.E-01	8.E-01
Cyanide	24	-	0.00E+00	0.00E+00	0.E+00	0.E+00	-	-
Iron	-	-	6.76E+01	8.43E+01	-	-	-	-
Lead	8	80	5.33E+00	1.20E+01	7.E-01	2.E+00	7.E-02	2.E-01
Manganese	88	284	4.62E+00	7.57E+00	5.E-02	9.E-02	2.E-02	3.E-02
Mercury	13.2	-	2.46E-01	5.86E-01	2.E-02	4.E-02	-	-
Nickel	53.5	107	1.89E+00	2.92E+00	4.E-02	5.E-02	2.E-02	3.E-02
Selenium	0.2	0.33	2.70E-02	3.29E-02	1.E-01	2.E-01	8.E-02	1.E-01
Silver	0.375	3.75	4.96E-01	1.50E+00	1.E+00	4.E+00	1.E-01	4.E-01
Thallium	0.0131	-	7.33E-03	7.33E-03	6.E-01	6.E-01	-	-
Vanadium	0.5	-	5.34E-02	7.15E-02	1.E-01	1.E-01	-	-
Zinc	200	410	4.21E+01	7.59E+01	2.E-01	4.E-01	1.E-01	2.E-01
4,4'-DDD	-	-	1.91E-03	7.34E-03	-	-	-	-
4,4'-DDE	1	-	1.39E-03	4.01E-03	1.E-03	4.E-03	-	-
4,4'-DDT	0.8	4	2.84E-04	2.84E-04	4.E-04	4.E-04	7.E-05	7.E-05
Aldrin	0.2	1	2.61E-04	5.73E-04	1.E-03	3.E-03	3.E-04	6.E-04
alpha-BHC	1.6	3.2	1.69E-04	3.45E-04	1.E-04	2.E-04	5.E-05	1.E-04
alpha-Chlordane	4.6	9.2	2.29E-94	2.29E-04	5.E-05	5.E-05	2.E-05	2.E-05
Aroclor 1242	0.069	0.69	1.47E-01	3.32E-01	2.E+00	5.E+00	2.E-01	5.E-01
Aroclor 1248	0.01	0.1	2.57E-01	1.60E+00	2.6E+01	1.6E+02	3.E+00	2.E+01
Aroclor 1254	0.068	0.68	9.09E-02	1.93E-01	1.E+00	3.E+00	1.E-01	3.E-01
beta-BHC	1.6	3.2	3.14E-04	1.06E-03	2.E-04	7.E-04	1.E-04	3.E-04
delta-BHC	1.6	3.2	2.87E-04	7.91E-04	2.E-04	5.E-04	9.E-05	2.E-04

**Table 29. Little Brown Bat Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endosulfan II	0.15	-	6.65E-05	6.65E-05	4.E-04	4.E-04	-	-
Endosulfan sulfate	0.15	-	3.12E-04	9.28E-04	2.E-03	6.E-03	-	-
Endrin	0.092	0.92	7.84E-05	7.84E-05	9.E-04	9.E-04	9.E-05	9.E-05
Endrin ketone	0.092	0.92	4.99E-04	1.08E-03	5.E-03	1.E-02	5.E-04	1.E-03
gamma-BHC (Lindane)	8	-	1.48E-04	2.14E-04	2.E-05	3.E-05	-	-
gamma-Chlordane	4.6	9.2	5.89E-04	1.38E-03	1.E-04	3.E-04	6.E-05	2.E-04
Heptachlor epoxide	0.0025	-	1.36E-04	2.40E-04	5.E-02	1.E-01	-	-
2,2-oxybis(1-chloropropane)	-	-	1.90E-02	3.72E-02	-	-	-	-
2,4-Dichlorophenol	5.8	-	3.47E-02	1.66E-01	6.E-03	3.E-02	-	-
2,4-Dimethylphenol	4	-	3.21E-02	1.59E-01	8.E-03	4.E-02	-	-
2-Nitroaniline	3.75	-	1.83E-02	1.83E-02	5.E-03	5.E-03	-	-
2-Nitrophenol	-	-	1.73E-02	3.83E-02	-	-	-	-
4-Chloro-3-methylphenol	-	-	1.99E-02	3.13E-02	-	-	-	-
4-Chloroaniline	-	-	2.42E-02	9.45E-02	-	-	-	-
4-Nitrophenol	-	-	1.87E-02	1.87E-02	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	3.48E-03	3.48E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	1.36E-02	1.36E-02	-	-	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	2.62E-02	5.48E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	2.84E-02	5.76E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	2.56E-02	2.56E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	2.78E-02	5.76E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-chloroethoxy)methane	-	-	2.15E-02	8.71E-02	-	-	-	-
Bis(2-chloroethyl)ether	0.075	-	1.51E-02	2.81E-02	2.E-01	4.E-01	-	-
Bis(2-ethylhexyl)phthalate	18.3	183.3	4.11E-02	1.95E-01	2.E-03	1.E-02	2.E-04	1.E-03
Caprolactam	-	-	4.85E-02	1.50E-01	-	-	-	-
Chrysene	see HMW PAHs	see HMW PAHs	2.55E-02	2.55E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Di-n-butylphthalate	550	1833	1.16E-02	1.16E-02	2.E-05	2.E-05	6.E-06	6.E-06
Di-n-octylphthalate	7500	-	5.37E-02	9.51E-02	7.E-06	1.E-05	-	-
Diethylphthalate	4583	-	5.51E-02	1.87E-01	1.E-05	4.E-05	-	-
Fluoranthene	see HMW PAHs	see HMW PAHs	2.86E-02	7.39E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	1.72E-02	1.72E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Isophorone	3.45	-	2.64E-02	1.22E-02	8.E-03	4.E-02	-	-
N-Nitroso-di-n-propylamine	-	-	1.68E-02	4.31E-02	-	-	-	-

**Table 29. Little Brown Bat Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Naphthalene	see LMW PAHs	see LMW PAHs	2.39E-02	5.50E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Nitrobenzene	0.64	-	4.89E-02	3.21E-01	8.E-02	5.E-01	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	2.10E-02	4.35E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	2.71E-02	6.17E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	4.84E-02	1.02E-01	9.E-03	2.E-02	9.E-04	2.E-03
High Molecular Weight PAHs	1	10	2.06E-01	3.74E-01	2.E-01	4.E-01	2.E-02	4.E-02
1,2,4-Trichlorobenzene	-	-	8.80E-03	6.61E-02	-	-	-	-
1,2-Dichlorobenzene	-	-	7.04E-03	4.99E-02	-	-	-	-
1,4-Dichlorobenzene	-	-	3.07E-03	2.23E-02	-	-	-	-
2-Butanone	1771	4571	3.26E-03	4.03E-03	2.E-06	2.E-06	7.E-07	9.E-07
Acetone	10	50	6.90E-03	1.27E-02	7.E-04	1.E-03	1.E-04	3.E-04
Carbon Disulfide	-	-	1.53E-02	1.28E-01	-	-	-	-
Methyl Acetate	-	-	8.43E-03	6.77E-02	-	-	-	-
Methylene chloride	5.85	50	4.39E-04	4.39E-04	8.E-05	8.E-05	9.E-06	9.E-06
Tetrachloroethylene	1.4	7	4.93E-03	3.58E-02	4.E-03	3.E-02	7.E-04	5.E-03
Tetrahydrofuran	-	-	1.20E-03	1.20E-03	-	-	-	-
Toluene	26	260	5.87E-04	5.87E-04	2.E-05	2.E-05	2.E-06	2.E-06
Xylene (Total)	2.1	2.6	5.07E-04	5.07E-04	2.E-04	2.E-04	2.E-04	2.E-04
<b>TOTAL ESQS</b>					<b>2.3E+02</b>	<b>8.0E+02</b>	<b>2.3E+01</b>	<b>8.0E+01</b>

**Table 30. Mallard Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.40E-06	5.09E-06	1.E-01	4.E-01	1.E-02	4.E-02
Aluminum	109.7	-	1.02E+00	1.35E+00	9.E-03	1.E-02	-	-
Antimony			1.08E-03	7.24E-03	-	-	-	-
Arsenic	5.14	12.84	1.24E-03	1.98E-03	2.E-04	4.E-04	1.E-04	2.E-04
Barium	20.8	41.7	1.20E-02	2.08E-02	6.E-04	1.E-03	3.E-04	5.E-04
Beryllium	-	-	3.13E-04	5.81E-04	-	-	-	-
Cadmium	1.4	14	4.08E-02	8.55E-02	3.E-02	6.E-02	3.E-03	6.E-03
Chromium	1	5	1.89E+00	4.51E+00	2.E+00	5.E+00	4.E-01	9.E-01
Cobalt	-	-	2.41E-03	2.91E-03	-	-	-	-
Copper	47	61.7	1.13E-01	1.79E-01	2.E-03	4.E-03	2.E-03	3.E-03
Cyanide	0.04	-	1.21E-05	1.75E-05	3.E-04	4.E-04	-	-
Iron	-	-	1.75E+00	2.18E+00	-	-	-	-
Lead	1.13	11.3	8.92E-02	2.00E-01	8.E-02	2.E-01	8.E-03	2.E-02
Manganese	977	-	1.20E-01	1.97E-01	1.E-04	2.E-04	-	-
Mercury	0.45	0.9	3.98E-03	9.48E-03	9.E-03	2.E-02	4.E-03	1.E-02
Nickel	77.4	107	2.96E-02	4.57E-02	4.E-04	6.E-04	3.E-04	4.E-04
Selenium	0.5	1	4.29E-04	5.23E-04	9.E-04	1.E-03	4.E-04	5.E-04
Silver	178	-	7.62E-03	2.31E-02	4.E-05	1.E-04	-	-
Thallium	0.35	-	1.19E-04	1.19E-04	3.E-04	3.E-04	-	-
Vanadium	11.4	-	1.33E-03	1.78E-03	1.E-04	2.E-04	-	-
Zinc	14.5	131	6.64E-01	1.20E+00	5.E-02	8.E-02	5.E-03	9.E-03
4,4'-DDD	-	-	2.95E-05	1.13E-04	-	-	-	-
4,4'-DDE	0.845	-	2.15E-05	6.18E-05	3.E-05	7.E-05	-	-
4,4'-DDT	0.0028	-	4.39E-06	4.39E-06	2.E-03	2.E-03	-	-
Aldrin	0.061	-	4.05E-06	8.89E-05	7.E-05	1.E-03	-	-
alpha-BHC	0.56	2.25	2.68E-06	5.45E-06	5.E-06	1.E-05	1.E-06	2.E-06
alpha-Chlordane	2.14	10.7	1.16E-05	1.16E-05	5.E-06	5.E-06	1.E-06	1.E-06
Aroclor 1242	0.41	-	2.25E-03	5.07E-03	5.E-03	1.E-02	-	-
Aroclor 1248	4.74	-	3.92E-03	2.44E-02	8.E-04	5.E-03	-	-
Aroclor 1254	0.18	1.8	1.39E-03	2.94E-03	8.E-03	2.E-02	8.E-04	2.E-03
beta-BHC	0.56	2.25	4.94E-06	1.67E-05	9.E-06	3.E-05	2.E-06	7.E-06
delta-BHC	0.56	2.25	4.49E-06	1.24E-05	8.E-06	2.E-05	2.E-06	6.E-06

**Table 30. Mallard Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endosulfan II	10	-	1.05E-06	1.05E-06	1.E-07	1.E-07	-	-
Endosulfan sulfate	10	-	4.94E-06	1.47E-05	5.E-07	1.E-06	-	-
Endrin	0.3	-	1.21E-06	1.21E-06	4.E-06	4.E-06	-	-
Endrin ketone	0.3	-	7.76E-06	1.68E-05	3.E-05	6.E-05	-	-
gamma-BHC (Lindane)	2	20	2.33E-06	3.37E-06	1.E-06	2.E-06	1.E-07	2.E-07
gamma-Chlordane	2.14	10.7	9.07E-06	2.13E-05	4.E-06	1.E-05	8.E-07	2.E-06
Heptachlor epoxide	65	-	2.27E-06	4.01E-06	3.E-08	6.E-08	-	-
2,2-oxybis(1-chloropropane)	-	-	3.26E-04	6.38E-04	-	-	-	-
2,4-Dichlorophenol	-	-	5.68E-04	2.73E-03	-	-	-	-
2,4-Dimethylphenol	-	-	5.65E-04	2.80E-03	-	-	-	-
2-Nitroaniline	-	-	3.65E-04	3.65E-04	-	-	-	-
2-Nitrophenol	-	-	3.48E-04	7.72E-04	-	-	-	-
4-Chloro-3-methylphenol	-	-	3.24E-04	5.10E-04	-	-	-	-
4-Chloroaniline	-	-	4.52E-04	1.76E-03	-	-	-	-
4-Nitrophenol	-	-	3.60E-04	3.60E-04	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	5.43E-05	5.43E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	3.07E-04	3.07E-04	-	-	-	-
Benzo(a)anthracene	-	-	4.05E-04	8.49E-04	-	-	-	-
Benzo(a)pyrene	-	-	4.40E-04	8.91E-04	-	-	-	-
Benzo(b)fluoranthene	-	-	3.96E-04	3.96E-04	-	-	-	-
Benzo(k)fluoranthene	-	-	4.30E-04	8.91E-04	-	-	-	-
Bis(2-chloroethoxy)methane	-	-	5.45E-04	2.20E-03	-	-	-	-
Bis(2-chloroethyl)ether	-	-	3.73E-04	6.96E-04	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	6.47E-04	3.07E-03	6.E-04	3.E-03	-	-
Caprolactam	-	-	2.16E-03	8.02E-03	-	-	-	-
Chrysene	-	-	3.95E-04	3.95E-04	-	-	-	-
Di-n-butylphthalate	0.11	1.1	1.79E-04	1.79E-04	2.E-03	2.E-03	2.E-04	2.E-04
Di-n-octylphthalate	-	-	8.26E-04	1.46E-03	-	-	-	-
Diethylphthalate	-	-	9.42E-04	3.19E-03	-	-	-	-
Fluoranthene	-	-	4.44E-04	1.15E-03	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	2.65E-04	2.65E-04	-	-	-	-
Isophorone	-	-	5.49E-04	2.55E-03	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	4.12E-04	1.06E-03	-	-	-	-

**Table 30. Mallard Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Naphthalene	see LMW PAHs	see LMW PAHs	3.81E-04	8.76E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Nitrobenzene	-	-	9.59E-04	6.29E-03	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	3.27E-04	6.78E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	4.22E-04	9.58E-04	-	-	-	-
Low Molecular Weight PAHs	40	400	7.62E-04	1.61E-03	2.E-05	4.E-05	2.E-06	4.E-06
1,2,4-Trichlorobenzene	-	-	1.38E-04	1.03E-03	-	-	-	-
1,2-Dichlorobenzene	-	-	1.12E-04	7.91E-04	-	-	-	-
1,4-Dichlorobenzene	-	-	4.87E-05	3.53E-04	-	-	-	-
2-Butanone	-	-	1.29E-04	1.60E-04	-	-	-	-
Acetone	52	-	7.39E-04	1.36E-03	1.E-05	3.E-05	-	-
Carbon Disulfide	-	-	2.79E-04	2.34E-03	-	-	-	-
Methyl Acetate	-	-	5.47E-04	4.39E-03	-	-	-	-
Methylene chloride	-	-	1.08E-05	1.08E-05	-	-	-	-
Tetrachloroethylene	-	-	8.33E-05	6.05E-04	-	-	-	-
Tetrahydrofuran	-	-	3.54E-05	3.54E-05	-	-	-	-
Toluene	-	-	1.23E-05	1.23E-05	-	-	-	-
Xylene (Total)	-	-	8.13E-06	8.13E-06	-	-	-	-
<b>TOTAL ESQS</b>					2.E+00	5.E+00	4.E-01	1.E+00

**Table 31. Raccoon Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.24E-05	4.39E-05	1.2E+01	4.4E+01	1.E+00	4.E+00
Aluminum	1.93	19.3	2.76E+01	3.66E+01	1.4E+01	1.9E+01	1.E+00	2.E+00
Antimony	0.143	1.43	8.86E-03	5.91E-02	6.E-02	4.E-01	6.E-03	4.E-02
Arsenic	4.6	9.3	1.18E-02	1.90E-02	3.E-03	4.E-03	1.E-03	2.E-03
Barium	5.1	-	2.67E-01	4.63E-01	5.E-02	9.E-02	-	-
Beryllium	0.66	-	2.31E-03	4.29E-03	-	-	-	-
Cadmium	1	10	1.95E-01	4.08E-01	2.E-01	4.E-01	2.E-02	4.E-02
Chromium	2737	-	2.23E+01	5.30E+01	8.E-03	2.E-02	-	-
Cobalt	-	-	3.77E-02	4.55E-02	-	-	-	-
Copper	11.7	15.14	5.67E-01	9.01E-01	5.E-02	8.E-02	4.E-02	6.E-02
Cyanide	24	-	9.42E-04	1.36E-03	4.E-05	6.E-05	-	-
Iron	-	-	5.97E+01	7.45E+01	-	-	-	-
Lead	8	80	9.12E-01	2.05E+00	1.E-01	3.E-01	1.E-02	3.E-02
Manganese	88	284	3.00E+00	4.92E+00	3.E-02	6.E-02	1.E-02	2.E-02
Mercury	1	-	2.39E-02	5.69E-02	2.E-02	6.E-02	-	-
Nickel	53.5	107	1.74E-01	2.69E-01	3.E-03	5.E-03	2.E-03	3.E-03
Selenium	0.2	0.33	3.02E-03	3.68E-03	2.E-02	2.E-02	9.E-03	1.E-02
Silver	0.375	3.75	3.40E-02	1.03E-01	9.E-02	3.E-01	9.E-03	3.E-02
Thallium	0.0131	-	9.54E-04	9.54E-04	7.E-02	7.E-02	-	-
Vanadium	0.5	-	4.24E-02	5.68E-02	8.E-02	1.E-01	-	-
Zinc	200	410	3.33E+00	6.00E+00	2.E-02	3.E-02	8.E-03	1.E-02
4,4'-DDD	-	-	1.52E-04	5.86E-04	-	-	-	-
4,4'-DDE	1	-	1.08E-04	3.11E-04	1.E-04	3.E-04	-	-
4,4'-DDT	0.8	4	2.27E-05	2.27E-05	3.E-05	3.E-05	6.E-06	6.E-06
Aldrin	0.2	1	2.17E-05	4.77E-05	1.E-04	2.E-04	2.E-05	5.E-05
alpha-BHC	0.014	0.14	1.58E-05	3.22E-05	1.E-03	2.E-03	1.E-04	2.E-04
alpha-Chlordane	4.6	9.2	6.06E-05	6.06E-05	1.E-05	1.E-05	7.E-06	7.E-06
Aroclor 1242	0.069	0.69	9.51E-03	2.14E-02	1.E-01	3.E-01	1.E-02	3.E-02
Aroclor 1248	0.01	0.1	1.66E-02	1.03E-01	2.E+00	1.0E+01	2.E-01	1.E+00
Aroclor 1254	0.14	0.69	5.86E-03	1.24E-02	4.E-02	9.E-02	8.E-03	2.E-02
beta-BHC	0.014	0.14	2.89E-05	9.75E-05	2.E-03	7.E-03	2.E-04	7.E-04
delta-BHC	0.014	0.14	2.57E-05	7.08E-05	2.E-03	5.E-03	2.E-04	5.E-04



**Table 31. Raccoon Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endosulfan II	0.15	-	6.19E-06	6.19E-06	4.E-05	4.E-05	-	-
Endosulfan sulfate	0.15	-	2.94E-05	8.72E-05	2.E-04	6.E-04	-	-
Endrin	0.092	0.92	6.50E-06	6.50E-06	7.E-05	7.E-05	7.E-06	7.E-06
Endrin ketone	0.092	0.92	4.15E-05	9.01E-05	5.E-04	1.E-03	5.E-05	1.E-04
gamma-BHC (Lindane)	8	-	1.36E-05	1.96E-05	2.E-06	2.E-06	-	-
gamma-Chlordane	4.6	9.2	4.51E-05	1.06E-04	1.E-05	2.E-05	5.E-06	1.E-05
Heptachlor epoxide	0.1	1	1.54E-05	2.73E-05	2.E-04	3.E-04	2.E-05	3.E-05
2,2-oxybis(1-chloropropane)	-	-	2.33E-03	4.56E-03	-	-	-	-
2,4-Dichlorophenol	5.8	-	3.71E-03	1.78E-02	6.E-04	3.E-03	-	-
2,4-Dimethylphenol	4	-	4.22E-03	2.09E-02	1.E-03	5.E-03	-	-
2-Nitroaniline	3.75	-	3.21E-03	3.21E-03	9.E-04	9.E-04	-	-
2-Nitrophenol	-	-	3.10E-03	6.87E-03	-	-	-	-
4-Chloro-3-methylphenol	-	-	2.09E-03	3.30E-03	-	-	-	-
4-Chloroaniline	-	-	3.67E-03	1.43E-02	-	-	-	-
4-Nitrophenol	-	-	3.04E-03	3.04E-03	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	3.04E-04	3.04E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	3.04E-03	3.04E-03	-	-	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	2.14E-03	4.49E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	2.28E-03	4.63E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	2.06E-03	2.06E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	2.23E-03	4.63E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-chloroethoxy)methane	-	-	5.89E-03	2.38E-02	-	-	-	-
Bis(2-chloroethyl)ether	0.075	-	3.98E-03	7.42E-03	5.E-02	1.E-01	-	-
Bis(2-ethylhexyl)phthalate	18.3	183.3	3.76E-03	1.78E-02	2.E-04	1.E-03	2.E-05	1.E-04
Caprolactam	-	-	2.89E-02	1.14E-01	-	-	-	-
Chrysene	see HMW PAHs	see HMW PAHs	2.09E-03	2.09E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Di-n-butylphthalate	550	1833	9.47E-04	9.47E-04	2.E-06	2.E-06	5.E-07	5.E-07
Di-n-octylphthalate	7500	-	4.01E-03	7.10E-03	5.E-07	9.E-07	-	-
Diethylphthalate	4583	-	6.70E-03	2.27E-02	1.E-06	5.E-06	-	-
Fluoranthene	see HMW PAHs	see HMW PAHs	2.42E-03	6.28E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	1.35E-03	1.35E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Isophorone	3.45	-	5.05E-03	2.34E-02	1.E-03	7.E-03	-	-
N-Nitroso-di-n-propylamine	-	-	4.36E-03	1.12E-02	-	-	-	-

**Table 31. Raccoon Risk – Lagoon Aquatic Area Sediments**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Naphthalene	see LMW PAHs	see LMW PAHs	2.32E-03	5.33E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Nitrobenzene	0.64	-	8.27E-03	5.43E-02	1.E-02	8.E-02	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	1.83E-03	3.80E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	2.30E-03	5.24E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	4.45E-03	9.43E-03	8.E-04	2.E-03	8.E-05	2.E-04
High Molecular Weight PAHs	1	10	1.69E-02	3.08E-02	2.E-02	3.E-02	2.E-03	3.E-03
1,2,4-Trichlorobenzene	-	-	7.77E-04	5.84E-03	-	-	-	-
1,2-Dichlorobenzene	-	-	6.67E-04	4.73E-03	-	-	-	-
1,4-Dichlorobenzene	-	-	2.91E-04	2.11E-03	-	-	-	-
2-Butanone	1771	4571	1.73E-03	2.14E-03	1.E-06	1.E-06	4.E-07	5.E-07
Acetone	10	50	1.20E-02	2.20E-02	1.E-03	2.E-03	2.E-04	4.E-04
Carbon Disulfide	-	-	2.20E-03	1.84E-02	-	-	-	-
Methyl Acetate	-	-	8.29E-03	6.65E-02	-	-	-	-
Methylene chloride	5.85	50	1.15E-04	1.15E-04	2.E-05	2.E-05	2.E-06	2.E-06
Tetrachloroethylene	1.4	7	5.79E-04	4.20E-03	4.E-04	3.E-03	8.E-05	6.E-04
Tetrahydrofuran	-	-	3.98E-04	3.98E-04	-	-	-	-
Toluene	26	260	1.18E-04	1.18E-04	5.E-06	5.E-06	5.E-07	5.E-07
Xylene (Total)	2.1	2.6	5.05E-05	5.05E-05	2.E-05	2.E-05	2.E-05	2.E-05
<b>TOTAL ESQS</b>					<b>2.9E+01</b>	<b>7.6E+01</b>	<b>3.E+00</b>	<b>8.E+00</b>

The mean and maximum concentrations of aluminum are greater in the sediment samples collected from the reference pond. Therefore, risk from aluminum to the raccoon is no greater than the risk from background concentrations. A slight risk is attributable to the mean aroclor 1248 concentration detected in the lagoon sediments as the ESQ for the NOAEL TRV is 2. However, as the ESQ for the LOAEL TRV is less than unity and since aroclor 1248 was detected in one lagoon sediment sample, the actual risk to the raccoon is uncertain. Dioxins may present a risk to foraging raccoons as the estimated exposure dose is substantially elevated above its chronic NOAEL TRV and slightly exceeds its chronic LOAEL TRV.

#### ***4.4.3 Lagoon Area Terrestrial Habitats***

Risk to wildlife that forage within the terrestrial habitats provided by the lagoons were evaluated by modeling exposure to five indicator species: the meadow vole, American woodcock, short-tailed shrew, American robin and deer mouse. Results of this analysis is presented below for each of the indicator species.

##### **Meadow Vole**

The estimated mean chronic NOAEL and LOAEL ESQs for the meadow vole are 47 and 5, respectively (Table 32). The mean estimated exposure dose of aluminum (ESQ is 4) is the only COC that exceeds its respective LOAEL TRV. Mean estimated exposure doses of aluminum (ESQ is 44) and dioxins (ESQ is 2) are the only COCs that exceed their NOAEL TRVs. Maximum estimated antimony, cadmium and thallium exposure doses received by the herbivorous meadow vole also slightly exceed their chronic NOAEL TRVs (ESQs are 2 or less). The mean concentration of aluminum is greater within the background surface soil samples although the maximum aluminum concentration at the lagoon (23,800 mg/kg) exceeds the maximum background aluminum concentration (17,700 mg/kg). Mean and maximum dioxin/furan congeners are significantly greater in lagoon surface soils than in the background surface soil samples. Overall, it appears that mean dioxin concentrations present only a slight risk to foraging mammalian herbivores as the estimated exposure dose exceeds its NOAEL TRV but is less than its LOAEL TRV.

##### **American Woodcock**

Risk to the woodcock from detected COC concentrations in lagoon surface soils and surface water and from estimated concentrations in vegetation and invertebrates are presented in Table 33. The total mean ESQs for the NOAEL and LOAEL TRVs are 840 and 160, respectively. Mean ESQs for LOAEL TRVs exceed unity for cadmium (ESQ is 2), chromium (ESQ is 150), and lead (ESQ is 2). Chromium provides nearly 95 percent of the total risk to the American woodcock based on the chronic LOAEL TRV. Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxin (ESQ is 8), aluminum (ESQ is 9), cadmium (ESQ is 16), chromium (ESQ is 770), lead (ESQ is 20) and zinc (ESQ is 7). Chromium provides over 90 percent of the total risk based on the chronic NOAEL TRV.

**Table 32. Meadow Vole Risk -- Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.50E-06	1.18E-05	2.E+00	1.2E+01	2.E-01	1.E+00
Aluminum	1.93	19.3	8.50E+01	2.03E+02	4.4E+01	1.1E+02	4.E+00	1.1E+01
Antimony	0.143	1.43	1.15E-02	2.22E-01	8.E-02	2.E+00	8.E-03	2.E-01
Arsenic	4.6	9.3	4.43E-02	1.28E-01	1.E-02	3.E-02	5.E-03	1.E-02
Barium	5.1	-	8.10E-01	2.07E+00	2.E-01	4.E-01	-	-
Beryllium	0.66	-	2.89E-03	6.99E-03	4.E-03	1.E-02	-	-
Cadmium	1	10	9.92E-03	1.04E+00	1.E-02	1.E+00	1.E-03	1.E-01
Chromium	2737	-	1.17E+01	1.39E+02	4.E-03	5.E-02	-	-
Cobalt	-	-	8.73E-02	1.46E-01	-	-	-	-
Copper	11.7	15.14	5.92E-01	1.48E+00	5.E-02	1.E-01	4.E-02	1.E-01
Cyanide	24	-	1.94E-03	2.10E-02	8.E-05	9.E-04	-	-
Iron	-	-	1.77E+02	2.77E+02	-	-	-	-
Lead	8	80	7.06E-01	6.20E+00	9.E-02	8.E-01	9.E-03	8.E-02
Manganese	88	284	1.30E+01	4.87E+01	1.E-01	6.E-01	5.E-02	2.E-01
Mercury	13.2	-	3.48E-02	3.64E-01	3.E-03	3.E-02	-	-
Nickel	53.5	107	1.90E-01	3.18E-01	4.E-03	6.E-03	2.E-03	3.E-03
Selenium	0.2	0.33	6.66E-03	1.76E-02	3.E-02	9.E-02	2.E-02	5.E-02
Silver	0.375	3.75	4.77E-03	3.55E-02	1.E-02	9.E-02	1.E-03	9.E-03
Thallium	0.0131	-	1.14E-02	2.85E-02	9.E-01	2.E+00	-	-
Vanadium	0.5	-	1.05E-01	3.08E-01	2.E-01	6.E-01	-	-
Zinc	200	410	4.90E+00	1.47E+01	2.E-02	7.E-02	1.E-02	4.E-02
4,4'-DDE	1	-	1.67E-05	4.34E-05	2.E-05	4.E-05	-	-
4,4'-DDT	0.8	4	1.99E-05	8.75E-05	2.E-05	1.E-04	5.E-06	2.E-05
alpha-Chlordane	4.6	9.2	1.42E-05	9.78E-05	3.E-06	2.E-05	2.E-06	1.E-05
beta-BHC	1.6	3.2	2.40E-05	2.45E-04	2.E-05	2.E-04	8.E-06	8.E-05
delta-BHC	1.6	3.2	3.99E-06	3.99E-06	2.E-06	2.E-06	1.E-06	1.E-06
Endosulfan I	0.15	-	7.85E-06	7.85E-06	5.E-05	5.E-05	-	-
Endosulfan sulfate	0.15	-	4.04E-05	1.58E-04	3.E-04	1.E-03	-	-
Endrin	0.092	0.92	1.91E-05	3.51E-05	2.E-04	4.E-04	2.E-05	4.E-05
Endrin aldehyde	0.092	0.92	1.06E-05	1.06E-05	1.E-04	1.E-04	1.E-05	1.E-05
Endrin ketone	0.092	0.92	2.12E-05	5.10E-05	2.E-04	6.E-04	2.E-05	6.E-05
gamma-BHC (Lindane)	8	-	1.58E-05	1.58E-05	2.E-06	2.E-06	-	-

**Table 32. Meadow Vole Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	4.6	9.2	1.16E-05	6.95E-05	3.E-06	2.E-05	1.E-06	8.E-06
Heptachlor	0.0025	-	1.36E-05	2.44E-05	5.E-03	1.E-02	-	-
Heptachlor epoxide	0.0025	-	4.57E-05	6.94E-05	2.E-02	3.E-02	-	-
Methoxychlor	100	200	1.76E-05	1.76E-05	2.E-07	2.E-07	9.E-08	9.E-08
Anthracene	see LMW PAHs	see LMW PAHs	3.81E-03	8.24E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	3.64E-03	3.12E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	3.45E-03	2.82E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	3.17E-03	2.12E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	2.92E-03	1.47E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	3.29E-03	2.47E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	6.10E-03	2.42E-02	3.E-04	1.E-03	3.E-05	1.E-04
Carbazole	5	-	1.89E-03	1.89E-03	4.E-04	4.E-04	-	-
Chrysene	see HMW PAHs	see HMW PAHs	3.71E-03	3.20E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Di-n-butylphthalate	550	1833	8.34E-04	8.34E-04	2.E-06	2.E-06	5.E-07	5.E-07
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	2.65E-03	5.30E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	5.42E-03	6.83E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	2.84E-03	1.46E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	2.64E-03	2.64E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	5.04E-03	3.34E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	5.38E-03	6.76E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	1.15E-02	4.43E-02	2.E-03	8.E-03	2.E-04	8.E-04
High Molecular Weight PAHs	1	10	3.65E-02	3.08E-01	4.E-02	3.E-01	4.E-03	3.E-02
1,4-Dichlorobenzene	-	-	5.82E-05	1.45E-04	-	-	-	-
2-Butanone	1771	4571	1.07E-02	1.01E-01	6.E-06	6.E-05	2.E-06	2.E-05
Acetone	10	50	1.22E-01	1.02E+00	1.E-02	1.E-01	2.E-03	2.E-02
Benzene	26.36	263.6	2.87E-04	1.65E-03	1.E-05	6.E-05	1.E-06	6.E-06
Carbon Disulfide	-	-	3.27E-04	1.78E-03	-	-	-	-
Methylene chloride	5.85	50	7.76E-04	3.40E-03	1.E-04	6.E-04	2.E-05	7.E-05
Toluene	26	260	1.56E-03	1.39E-02	6.E-05	5.E-04	6.E-06	5.E-05
Xylene (Total)	2.1	2.6	2.01E-03	7.56E-02	1.E-03	4.E-02	8.E-04	3.E-02
<b>TOTAL ESQS</b>					<b>4.7E+01</b>	<b>1.3E+02</b>	<b>5.E+00</b>	<b>1.3E+01</b>

**Table 33. American Woodcock Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.14E-04	9.77E-04	8.1E+00	7.0E+01	8.E-01	7.E+00
Aluminum	109.7	-	9.79E+02	2.34E+03	9.E+00	2.1E+01	-	-
Antimony	-	-	1.79E-01	3.45E+00	-	-	-	-
Arsenic	2.46	7.38	7.29E-01	2.11E+00	3.E-01	9.E-01	1.E-01	3.E-01
Barium	20.8	41.7	6.32E+00	1.62E+01	3.E-01	8.E-01	2.E-01	4.E-01
Beryllium	-	-	8.71E-02	2.11E-01	-	-	-	-
Cadmium	1.4	14	2.27E+01	2.38E+02	1.6E+01	1.7E+02	2.E+00	1.7E+01
Chromium	1	5	7.73E+02	9.18E+03	7.7E+02	9.2E+03	1.5E+02	1.8E+03
Cobalt	-	-	1.20E+00	2.02E+00	-	-	-	-
Copper	47	61.7	5.35E+00	1.34E+01	1.E-01	3.E-01	9.E-02	2.E-01
Cyanide	0.04	-	1.85E-02	2.00E-01	5.E-01	5.E+00	-	-
Iron	-	-	1.92E+03	2.99E+03	-	-	-	-
Lead	1.13	11.3	2.25E+01	1.97E+02	2.0E+01	1.7E+02	2.E+00	1.7E+01
Manganese	977	-	7.56E+01	2.84E+02	8.E-02	3.E-01	-	-
Mercury	0.45	0.9	2.81E-01	2.94E+00	6.E-01	7.E+00	3.E-01	3.E+00
Nickel	77.4	107	1.48E+01	2.47E+01	2.E-01	3.E-01	1.E-01	2.E-01
Selenium	0.5	1	2.73E-01	7.22E-01	5.E-01	1.E+00	3.E-01	7.E-01
Silver	178	-	5.27E-01	3.94E+00	3.E-03	2.E-02	-	-
Thallium	0.35	-	3.11E-01	7.76E-01	9.E-01	2.E+00	-	-
Vanadium	1.5	2.2	1.11E+00	3.25E+00	7.E-01	2.E+00	5.E-01	1.E+00
Zinc	14.5	131	9.60E+01	2.88E+02	7.E+00	2.0E+01	7.E-01	2.E+00
4,4'-DDE	0.845	-	1.81E-03	4.72E-03	2.E-03	6.E-03	-	-
4,4'-DDT	0.0028	-	1.84E-03	8.07E-03	7.E-01	3.E+00	-	-
alpha-Chlordane	2.14	10.7	1.24E-03	8.50E-03	6.E-04	4.E-03	1.E-04	8.E-04
beta-BHC	0.56	2.25	8.09E-04	8.26E-03	1.E-03	1.E-02	4.E-04	4.E-03
delta-BHC	0.56	2.25	1.67E-04	1.67E-04	3.E-04	3.E-04	7.E-05	7.E-05
Endosulfan I	10	-	2.05E-04	2.05E-04	2.E-05	2.E-05	-	-
Endosulfan sulfate	10	-	1.17E-03	4.55E-03	1.E-04	5.E-04	-	-
Endrin	0.01	0.1	1.41E-03	2.59E-03	1.E-01	3.E-01	1.E-02	3.E-02
Endrin aldehyde	0.01	0.1	6.41E-04	6.41E-04	6.E-02	6.E-02	6.E-03	6.E-03
Endrin ketone	0.01	0.1	1.40E-03	3.36E-03	1.E-01	3.E-01	1.E-02	3.E-02
gamma-BHC (Lindane)	2	20	5.56E-04	5.56E-04	3.E-04	3.E-04	3.E-05	3.E-05
gamma-Chlordane	2.14	10.7	1.34E-03	8.04E-03	6.E-04	4.E-03	1.E-04	8.E-04

**Table 33. American Woodcock Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Heptachlor	65	-	6.72E-04	1.20E-03	1.E-05	2.E-05	-	-
Heptachlor epoxide	65	-	4.76E-04	7.24E-04	7.E-06	1.E-05	-	-
Methoxychlor	-	-	1.01E-03	1.01E-03	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	1.93E-01	4.18E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzo(a)anthracene	-	-	2.91E-01	2.49E+00	-	-	-	-
Benzo(a)pyrene	-	-	3.09E-01	2.53E+00	-	-	-	-
Benzo(b)fluoranthene	-	-	2.84E-01	1.89E+00	-	-	-	-
Benzo(g,h,i)perylene	-	-	2.88E-01	1.45E+00	-	-	-	-
Benzo(k)fluoranthene	-	-	2.94E-01	2.21E+00	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	1.72E-01	9.00E-01	2.E-01	8.E-01	-	-
Carbazole	-	-	8.13E-02	8.13E-02	-	-	-	-
Chrysene	-	-	2.97E-01	2.56E+00	-	-	-	-
Di-n-butylphthalate	0.11	1.1	6.65E-02	6.65E-02	6.E-01	6.E-01	6.E-02	6.E-02
Dibenzo(a,h)anthracene	-	-	2.78E-01	5.55E-01	-	-	-	-
Fluoranthene	-	-	3.42E-01	4.30E+00	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	2.84E-01	1.46E+00	-	-	-	-
Naphthalene	see LMW PAHs	see LMW PAHs	6.22E-02	6.22E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	2.56E-01	1.70E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	3.36E-01	4.22E+00	-	-	-	-
Low Molecular Weight PAHs	40	400	5.11E-01	2.18E+00	1.E-02	5.E-02	1.E-03	5.E-03
1,4-Dichlorobenzene	-	-	1.59E-03	3.98E-03	-	-	-	-
2-Butanone	-	-	8.25E-02	8.25E-02	-	-	-	-
Acetone	52	-	4.65E-02	3.93E-01	9.E-04	8.E-03	-	-
Benzene	-	-	1.44E-03	8.32E-03	-	-	-	-
Carbon Disulfide	-	-	1.64E-03	8.98E-03	-	-	-	-
Methylene chloride	-	-	1.36E-03	5.94E-03	-	-	-	-
Toluene	-	-	5.27E-03	1.42E-01	-	-	-	-
Xylene (Total)	-	-	3.96E-02	1.49E+00	-	-	-	-
<b>TOTAL ESQS</b>					<b>8.4E-02</b>	<b>9.7E+03</b>	<b>1.6E+02</b>	<b>1.9E+03</b>

The mean concentrations of aluminum and zinc within the background surface soil samples are greater than detected within the lagoon surface soils. Therefore, risk from mean concentrations of aluminum and zinc is no greater than background risk. Chromium, lead and cadmium present the greatest risk to insectivorous birds foraging within the lagoon terrestrial habitats as the mean estimated exposure doses received by these COCs exceeds both the chronic NOAEL and LOAEL TRVs (particularly for chromium which greatly exceeds its respective TRVs). Impacts from ingestion of dioxins are possible although the mean estimated exposure dose is less than its LOAEL TRV. Maximum estimated exposure doses of dioxin, however, exceed its LOAEL TRV indicating impacts are possible if foraging is restricted to the vicinity of the highest detected concentration. Maximum concentrations of mercury and vanadium also result in estimated exposure doses that exceed their respective chronic NOAEL and LOAEL TRVs indicating impacts are possible if foraging is restricted to areas of maximum mercury and vanadium concentrations.

#### Short-tailed Shrew

Risk to the shrew from detected COC concentrations in lagoon surface soils and from estimated concentrations in vegetation and invertebrates are presented in Table 34. The total mean ESQs for the NOAEL and LOAEL TRVs are 600 and 59, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxins (ESQ is 16), aluminum (ESQ is 39) and cadmium (ESQ is 2). Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxins (ESQ is 160), aluminum (ESQ is 390), cadmium (ESQ is 18), lead (ESQ is 2), selenium (ESQ is 1), silver (ESQ is 1), thallium (ESQ is 18) and vanadium (ESQ is 2) and high molecular weight PAHs (ESQ is 2). Dioxins and aluminum provide over 90 percent of the total risk based on the chronic NOAEL TRV.

The mean concentrations of aluminum and vanadium within the background surface soil samples are greater than detected within the lagoon surface soils. Therefore, risk from mean concentrations of these two COCs is no greater than background risk. Dioxins and cadmium appear to present the greatest risk to insectivorous mammals foraging within the terrestrial habitats of the lagoons as the mean estimated exposure doses exceed both the chronic NOAEL and LOAEL. The mean estimated exposure dose for lead, selenium and silver slightly exceed their respective NOAEL TRVs (ESQs are 2 or less) and are less than their respective LOAEL TRVs (although the maximum lead and selenium exposure doses result in an ESQ of 2 each when compared to their LOAEL TRVs). The mean thallium exposure dose is substantially above its chronic NOAEL TRV. However, a LOAEL TRV for thallium is unavailable.



**Table 34. Short-tailed Shrew Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.62E-04	1.31E-03	1.6E+02	1.3E+03	1.6E+01	1.3E+02
Aluminum	1.93	19.3	7.53E+02	1.61E+03	3.9E+02	8.3E+02	3.9E+01	8.3E+01
Antimony	0.143	1.43	1.39E-01	2.58E+00	1.E+00	1.8E+01	1.E-01	2.E+00
Arsenic	4.6	9.3	5.65E-01	1.54E+00	1.E-01	3.E-01	6.E-02	2.E-01
Barium	5.1	-	4.82E+00	1.13E+01	9.E-01	2.E+00	-	-
Beryllium	0.66	-	6.79E-02	1.58E-01	1.E-01	2.E-01	-	-
Cadmium	1	10	1.79E+01	1.87E+02	1.8E+01	1.9E+02	2.E+00	1.9E+01
Chromium	2737	-	6.06E+02	7.06E+03	2.E-01	3.E+00	-	-
Cobalt	-	-	9.29E-01	1.43E+00	-	-	-	-
Copper	11.7	15.14	4.09E+00	9.91E+00	3.E-01	8.E-01	3.E-01	7.E-01
Cyanide	24	-	1.23E-02	4.53E-01	5.E-04	2.E-02	-	-
Iron	-	-	1.47E+03	2.04E+03	-	-	-	-
Lead	8	80	1.75E+01	1.49E+02	2.E+00	1.9E+01	2.E-01	2.E+00
Manganese	88	284	5.71E+01	1.98E+02	6.E-01	2.E+00	2.E-01	7.E-01
Mercury	13.2	-	2.14E-01	2.24E+00	2.E-02	2.E-01	-	-
Nickel	53.5	107	1.16E+01	1.92E+01	2.E-01	4.E-01	1.E-01	2.E-01
Selenium	0.2	0.33	2.14E-01	5.49E-01	1.E+00	3.E+00	6.E-01	2.E+00
Silver	0.375	3.75	4.14E-01	3.08E+00	1.E+00	8.E+00	1.E-01	8.E-01
Thallium	0.0131	-	2.42E-01	5.78E-01	1.8E+01	4.4E+01	-	-
Vanadium	0.5	-	8.50E-01	2.22E+00	2.E+00	4.E+00	-	-
Zinc	200	410	7.46E+01	2.25E+02	4.E-01	1.E+00	2.E-01	5.E-01
4,4'-DDE	1	-	1.42E-03	3.66E-03	1.E-03	4.E-03	-	-
4,4'-DDT	0.8	4	1.44E-03	6.25E-03	2.E-03	8.E-03	4.E-04	2.E-03
alpha-Chlordane	4.6	9.2	9.68E-04	6.57E-03	2.E-04	1.E-03	1.E-04	7.E-04
beta-BHC	1.6	3.2	6.32E-04	6.36E-03	4.E-04	4.E-03	2.E-04	2.E-03
delta-BHC	1.6	3.2	1.29E-04	1.29E-04	8.E-05	8.E-05	4.E-05	4.E-05
Endosulfan I	0.15	-	1.58E-04	1.58E-04	1.E-03	1.E-03	-	-
Endosulfan sulfate	0.15	-	9.11E-04	3.50E-03	6.E-03	2.E-02	-	-
Endrin	0.092	0.92	1.10E-03	2.00E-03	1.E-02	2.E-02	1.E-03	2.E-03
Endrin aldehyde	0.092	0.92	4.95E-04	4.95E-04	5.E-03	5.E-03	5.E-04	5.E-04
Endrin ketone	0.092	0.92	1.10E-03	2.60E-03	1.E-02	3.E-02	1.E-03	3.E-03
gamma-BHC (Lindane)	8	-	4.28E-04	4.28E-04	5.E-05	5.E-05	-	-

**Table 34. Short-tailed Shrew Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	4.6	9.2	1.05E-03	6.24E-03	2.E-04	1.E-03	1.E-04	7.E-04
Heptachlor	0.0025	-	5.26E-04	9.27E-04	2.E-01	4.E-01	-	-
Heptachlor epoxide	0.0025	-	3.66E-04	5.58E-04	1.E-01	2.E-01	-	-
Methoxychlor	100	200	7.76E-04	7.76E-04	8.E-06	8.E-06	4.E-06	4.E-06
Anthracene	see LMW PAHs	see LMW PAHs	1.51E-01	3.22E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	2.28E-01	1.92E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	2.42E-01	1.96E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	2.23E-01	1.47E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	2.26E-01	1.12E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	2.31E-01	1.71E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	1.35E-01	6.93E-01	7.E-03	4.E-02	7.E-04	4.E-03
Carbazole	5	-	6.26E-02	6.26E-02	1.E-02	1.E-02	-	-
Chrysene	see HMW PAHs	see HMW PAHs	2.32E-01	1.98E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Di-n-butylphthalate	550	1833	5.14E-02	5.14E-02	9.E-05	9.E-05	3.E-05	3.E-05
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	2.18E-01	4.30E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	2.68E-01	3.32E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	2.23E-01	1.14E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	4.78E-02	4.78E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	2.00E-01	1.31E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	2.63E-01	3.26E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	3.99E-01	1.68E+00	8.E-02	3.E-01	8.E-03	3.E-02
High Molecular Weight PAHs	1	10	2.35E+00	1.83E+01	2.E+00	1.8E+01	2.E-01	2.E+00
1,4-Dichlorobenzene	-	-	1.24E-03	3.06E-03	-	-	-	-
2-Butanone	1771	4571	4.85E-03	6.91E-02	3.E-06	4.E-05	1.E-06	2.E-05
Acetone	10	50	1.58E-02	3.62E-01	2.E-03	4.E-02	3.E-04	7.E-03
Benzene	26.36	263.6	1.08E-03	6.44E-03	4.E-05	2.E-04	4.E-06	2.E-05
Carbon Disulfide	-	-	1.23E-03	6.95E-02	-	-	-	-
Methylene chloride	5.85	50	9.31E-04	4.72E-03	2.E-04	8.E-04	2.E-05	9.E-05
Toluene	26	260	4.21E-03	1.10E-01	2.E-04	4.E-03	2.E-05	4.E-04
Xylene (Total)	2.1	2.6	3.07E-02	1.15E+00	1.E-02	5.E-01	1.E-02	4.E-01
<b>TOTAL ESQS</b>					<b>6.0E+02</b>	<b>2.4E+03</b>	<b>5.9E+01</b>	<b>2.4E+02</b>

### American Robin

Risk to the omnivorous American robin from detected COC concentrations in lagoon surface soils and surface water and from estimated concentrations in vegetation and invertebrates are presented in Table 35. The total mean ESQs for the NOAEL and LOAEL TRVs are 1,000 and 190, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxins (ESQ is 1), cadmium (ESQ is 2), chromium (ESQ is 190), and lead (ESQ is 2). Chromium provides nearly 100 percent of the total risk to the American robin based on the chronic LOAEL TRV. Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxin (ESQ is 10), aluminum (ESQ is 6), cadmium (ESQ is 21), chromium (ESQ is 930), lead (ESQ is 22) and zinc (ESQ is 9). Chromium provides over 90 percent of the total risk based on the chronic NOAEL TRV.

The mean concentrations of aluminum and zinc within the background surface soil samples are greater than detected within the lagoon surface soils. Therefore, risk from mean concentrations of aluminum and zinc is no greater than background risk. Chromium, dioxin, lead and cadmium present the greatest risk to omnivorous birds foraging within the lagoon terrestrial habitats as the mean estimated exposure doses received by these COCs exceed both the chronic NOAEL and LOAEL TRVs (particularly for chromium which greatly exceeds its respective TRVs). In addition, maximum estimated exposure doses of mercury and zinc exceed their LOAEL TRVs indicating impacts are possible if foraging is restricted to the vicinity of the highest detected concentrations.

### Deer Mouse

Risk to the omnivorous deer mouse from detected COC concentrations in lagoon surface soils and surface waters and from estimated concentrations in vegetation and invertebrates are presented in Table 36. The total mean ESQs for the NOAEL and LOAEL TRVs are 170 and 16, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxins (ESQ is 8) and aluminum (ESQ is 6). Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxins (ESQ is 82), aluminum (ESQ is 63), cadmium (ESQ is 10), thallium (ESQ is 7) and high molecular weight PAHs (ESQ is 1).

The mean concentration of aluminum within the background surface soil samples is greater than detected within the lagoon surface soils. Therefore, risk from the mean concentration of aluminum is no greater than background risk. Dioxins appear to present the greatest risk to insectivorous mammals foraging within the terrestrial habitats of the lagoons as the mean estimated dioxin exposure dose exceeds both the chronic NOAEL and LOAEL TRVs. The mean estimated exposure dose for cadmium exceeds its NOAEL TRV but is slightly less than its LOAEL TRV (although the maximum cadmium exposure doses results in an ESQ of 10 when compared to its LOAEL TRV). The mean thallium exposure dose is substantially above its chronic NOAEL TRV. However, a LOAEL TRV for thallium is unavailable. Therefore, there is some uncertainty associated with this COC.

**Table 35. American Robin Risk – Lagoon Terrestrial Area Surface Soils**

	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.45E-04	1.24E-03	1.0E+01	8.9E+01	1.E+00	9.E+00
Aluminum	109.7	-	6.22E+02	1.49E+03	6.E+00	1.4E+01	-	-
Antimony	-	-	1.94E-01	3.74E+00	-	-	-	-
Arsenic	2.46	7.38	6.69E-01	1.94E+00	3.E-01	8.E-01	9.E-02	3.E-01
Barium	20.8	41.7	4.82E+00	1.24E+01	2.E-01	6.E-01	1.E-01	3.E-01
Beryllium	-	-	9.30E-02	2.25E-01	-	-	-	-
Cadmium	1.4	14	3.00E+01	3.14E+02	2.1E+01	2.2E+02	2.E+00	2.2E+01
Chromium	1	5	9.32E+02	1.11E+04	9.3E+02	1.1E+04	1.9E+02	2.2E+03
Cobalt	-	-	9.52E-01	1.59E+00	-	-	-	-
Copper	47	61.7	5.86E+00	1.46E+01	1.E-01	3.E-01	9.E-02	2.E-01
Cyanide	0.04	-	8.76E-03	9.50E-02	2.E-01	2.E+00	-	-
Iron	-	-	1.13E+03	1.76E+03	-	-	-	-
Lead	1.13	11.3	2.51E+01	2.20E+02	2.2E+01	1.9E+02	2.E+00	1.9E+01
Manganese	977	-	5.91E+01	2.22E+02	6.E-02	2.E-01	-	-
Mercury	0.45	0.9	3.56E-01	3.73E+00	8.E-01	8.E+00	4.E-01	4.E+00
Nickel	77.4	107	1.84E+01	3.08E+01	2.E-01	4.E-01	2.E-01	3.E-01
Selenium	0.5	1	3.14E-01	8.29E-01	6.E-01	2.E+00	3.E-01	8.E-01
Silver	178	-	6.88E-01	5.14E+00	4.E-03	3.E-02	-	-
Thallium	0.35	-	3.22E-01	8.04E-01	9.E-01	2.E+00	-	-
Vanadium	1.5	2.2	6.74E-01	1.97E+00	4.E-01	1.E+00	3.E-01	9.E-01
Zinc	14.5	131	1.29E+02	3.85E+02	9.E+00	2.7E+01	1.E+00	3.E+00
4,4'-DDE	0.845	-	2.27E-03	5.90E-03	3.E-03	7.E-03	-	-
4,4'-DDT	0.0028	-	2.28E-03	1.00E-02	8.E-01	4.E+00	-	-
alpha-Chlordane	2.14	10.7	1.53E-03	1.05E-02	7.E-04	5.E-03	1.E-04	1.E-03
beta-BHC	0.56	2.25	9.91E-04	1.01E-02	2.E-03	2.E-02	4.E-04	4.E-03
delta-BHC	0.56	2.25	2.04E-04	2.04E-04	4.E-04	4.E-04	9.E-05	9.E-05
Endosulfan I	10	-	2.53E-04	2.53E-04	3.E-05	3.E-05	-	-
Endosulfan sulfate	10	-	1.43E-03	5.59E-03	1.E-04	6.E-04	-	-
Endrin	0.01	0.1	1.73E-03	3.19E-03	2.E-01	3.E-01	2.E-02	3.E-02
Endrin aldehyde	0.01	0.1	7.85E-04	7.85E-04	8.E-02	8.E-02	8.E-03	8.E-03
Endrin ketone	0.01	0.1	1.72E-03	4.14E-03	2.E-01	4.E-01	2.E-02	4.E-02
gamma-BHC (Lindane)	2	20	6.80E-04	6.80E-04	3.E-04	3.E-04	3.E-05	3.E-05
gamma-Chlordane	2.14	10.7	1.68E-03	1.01E-02	8.E-04	5.E-03	2.E-04	9.E-04

**Table 35. American Robin Risk – Lagoon Terrestrial Area Surface Soils**

	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Heptachlor	65	-	8.21E-04	1.47E-03	1.E-05	2.E-05	-	-
Heptachlor epoxide	65	-	6.22E-04	9.46E-04	1.E-05	1.E-05	-	-
Methoxychlor	-	-	1.23E-03	1.23E-03	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	2.36E-01	5.11E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzo(a)anthracene	-	-	3.58E-01	3.06E+00	-	-	-	-
Benzo(a)pyrene	-	-	3.83E-01	3.13E+00	-	-	-	-
Benzo(b)fluoranthene	-	-	3.52E-01	2.35E+00	-	-	-	-
Benzo(g,h,i)perylene	-	-	3.59E-01	1.80E+00	-	-	-	-
Benzo(k)fluoranthene	-	-	3.65E-01	2.74E+00	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	2.11E-01	1.10E+00	2.E-01	1.E+00	-	-
Carbazole	-	-	9.93E-02	9.93E-02	-	-	-	-
Chrysene	-	-	3.66E-01	3.16E+00	-	-	-	-
Di-n-butylphthalate	0.11	1.1	8.20E-02	8.20E-02	7.E-01	7.E-01	7.E-02	7.E-02
Dibenzo(a,h)anthracene	-	-	3.46E-01	6.92E-01	-	-	-	-
Fluoranthene	-	-	4.18E-01	5.27E+00	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	3.54E-01	1.82E+00	-	-	-	-
Naphthalene	see LMW PAHs	see LMW PAHs	7.69E-02	7.69E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	3.13E-01	2.07E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	4.11E-01	5.17E+00	-	-	-	-
Low Molecular Weight PAHs	40	400	6.26E-01	2.66E+00	2.E-02	7.E-02	2.E-03	7.E-03
1,4-Dichlorobenzene	-	-	1.96E-03	4.90E-03	-	-	-	-
2-Butanone	-	-	2.58E-02	2.59E-01	-	-	-	-
Acetone	52	-	2.53E-01	2.15E+00	5.E-03	4.E-02	-	-
Benzene	-	-	2.11E-03	1.22E-02	-	-	-	-
Carbon Disulfide	-	-	2.41E-03	1.31E-02	-	-	-	-
Methylene chloride	-	-	2.81E-03	1.23E-02	-	-	-	-
Toluene	-	-	6.87E-03	1.85E-01	-	-	-	-
Xylene (Total)	-	-	4.93E-02	1.86E+00	-	-	-	-
TOTAL ESQS					1.0E+03	1.2E+04	1.9E+02	2.3E+03

**Table 36. Deer Mouse Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	8.20E-05	6.65E-04	8.2E+01	6.7E+02	8.E+00	6.7E+01
Aluminum	1.93	19.3	1.22E+02	2.92E+02	6.3E+01	1.5E+02	6.E+00	1.5E+01
Antimony	0.143	1.43	5.56E-02	1.07E+00	4.E-01	7.E+00	4.E-02	7.E-01
Arsenic	4.6	9.3	1.78E-01	5.16E-01	4.E-02	1.E-01	2.E-02	6.E-02
Barium	5.1	-	1.06E+00	2.72E+00	2.E-01	5.E-01	-	-
Beryllium	0.66	-	2.71E-02	6.54E-02	4.E-02	1.E-01	-	-
Cadmium	1	10	9.50E+00	9.94E+01	1.E+01	9.9E+01	1.E+00	1.E+01
Chromium	2737	-	2.86E+02	3.40E+03	1.E-01	1.E+00	-	-
Cobalt	-	-	2.29E-01	3.84E-01	-	-	-	-
Copper	11.7	15.14	1.63E+00	4.08E+00	1.E-01	3.E-01	1.E-01	3.E-01
Cyanide	24	-	1.04E-03	1.13E-02	4.E-05	5.E-04	-	-
Iron	-	-	2.01E+02	3.13E+02	-	-	-	-
Lead	8	80	7.44E+00	6.53E+01	9.E-01	8.E+00	9.E-02	8.E-01
Manganese	88	284	1.27E+01	4.74E+01	1.E-01	5.E-01	4.E-02	2.E-01
Mercury	13.2	-	1.04E-01	1.09E+00	8.E-03	8.E-02	-	-
Nickel	53.5	107	5.70E+00	9.55E+00	1.E-01	2.E-01	5.E-02	9.E-02
Selenium	0.2	0.33	9.44E-02	2.49E-01	5.E-01	1.E+00	3.E-01	8.E-01
Silver	0.375	3.75	2.17E-01	1.62E+00	6.E-01	4.E+00	6.E-02	4.E-01
Thallium	0.0131	-	9.25E-02	2.31E-01	7.E+00	1.8E+01	-	-
Vanadium	0.5	-	1.24E-01	3.64E-01	2.E-01	7.E-01	-	-
Zinc	200	410	3.99E+01	1.20E+02	2.E-01	6.E-01	1.E-01	3.E-01
4,4'-DDE	1	-	7.06E-04	1.84E-03	7.E-04	2.E-03	-	-
4,4'-DDT	0.8	4	7.07E-04	3.11E-03	9.E-04	4.E-03	2.E-04	8.E-04
alpha-Chlordane	4.6	9.2	4.74E-04	3.26E-03	1.E-04	7.E-04	5.E-05	4.E-04
beta-BHC	1.6	3.2	3.03E-04	3.09E-03	2.E-04	2.E-03	9.E-05	1.E-03
delta-BHC	1.6	3.2	2.22E-04	6.27E-05	1.E-04	4.E-05	7.E-05	2.E-05
Endosulfan I	0.15	-	2.10E-04	7.72E-05	1.E-03	5.E-04	-	-
Endosulfan sulfate	0.15	-	4.38E-04	1.71E-03	3.E-03	1.E-02	-	-
Endrin	0.092	0.92	5.35E-04	9.85E-04	6.E-03	1.E-02	6.E-04	1.E-03
Endrin aldehyde	0.092	0.92	4.51E-04	2.42E-04	5.E-03	3.E-03	5.E-04	3.E-04
Endrin ketone	0.092	0.92	5.33E-04	1.28E-03	6.E-03	1.E-02	6.E-04	1.E-03
gamma-BHC (Lindane)	8	-	2.23E-04	2.08E-04	3.E-05	3.E-05	-	-

**Table 36. Deer Mouse Risk – Lagoon Terrestrial Area Surface Soils**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	4.6	9.2	5.23E-04	3.15E-03	1.E-04	7.E-04	6.E-05	3.E-04
Heptachlor	0.0025	-	2.52E-04	4.51E-04	1.E-01	2.E-01	-	-
Heptachlor epoxide	0.0025	-	1.87E-04	2.85E-04	7.E-02	1.E-01	-	-
Methoxychlor	100	200	2.44E-03	3.79E-04	2.E-05	4.E-06	1.E-05	2.E-06
Anthracene	see LMW PAHs	see LMW PAHs	7.26E-02	1.57E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	1.11E-01	9.49E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	1.19E-01	9.71E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	1.09E-01	7.28E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	1.12E-01	5.60E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	1.13E-01	8.50E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	6.50E-02	3.37E-01	4.E-03	2.E-02	4.E-04	2.E-03
Carbazole	5	-	7.06E-02	3.05E-02	1.E-02	6.E-03	-	-
Chrysene	see HMW PAHs	see HMW PAHs	1.13E-01	9.78E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Di-n-butylphthalate	550	1833	7.89E-02	2.54E-02	1.E-04	5.E-05	4.E-05	1.E-05
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	1.08E-01	2.15E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	1.29E-01	1.62E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	1.10E-01	5.67E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	6.30E-02	2.34E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	9.61E-02	6.37E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	1.27E-01	1.59E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	2.32E-01	8.17E-01	4.E-02	2.E-01	4.E-03	2.E-02
High Molecular Weight PAHs	1	10	1.15E+00	9.03E+00	1.E+00	9.E+00	1.E-01	9.E-01
1,4-Dichlorobenzene	-	-	5.98E-04	1.49E-03	-	-	-	-
2-Butanone	1771	4571	7.56E-03	7.42E-02	4.E-06	4.E-05	2.E-06	2.E-05
Acetone	10	50	7.16E-02	6.03E-01	7.E-03	6.E-02	1.E-03	1.E-02
Benzene	26.36	263.6	6.28E-04	3.61E-03	2.E-05	1.E-04	2.E-06	1.E-05
Carbon Disulfide	-	-	7.14E-04	3.90E-03	-	-	-	-
Methylene chloride	5.85	50	8.13E-04	3.55E-03	1.E-04	6.E-04	2.E-05	7.E-05
Toluene	26	260	2.39E-03	5.68E-02	9.E-05	2.E-03	9.E-06	2.E-04
Xylene (Total)	2.1	2.6	1.50E-02	5.64E-01	7.E-03	3.E-01	6.E-03	2.E-01
<b>TOTAL ESQS</b>					<b>1.7E+02</b>	<b>9.7E+02</b>	<b>1.6E+01</b>	<b>9.6E+01</b>

#### **4.4.4 Landfill Pond**

The wildlife indicator species selected for the landfill pond are identical to those selected for the Hoosic River and include the belted kingfisher, mink, Canada goose, muskrat, spotted sandpiper, little brown bat, mallard and raccoon. Risks for each of these species is summarized below. The concentrations of COCs providing risk are also discussed in relation to background concentrations detected at the reference pond.

##### **Belted Kingfisher**

Risks to the kingfisher from detected COC concentrations in landfill pond surface water and sediments (as well as modeled concentrations in fish and aquatic invertebrates) are presented in Table 37. The total mean ESQs for the NOAEL and LOAEL TRVs are 7 and 1, respectively. No COCs have a mean or maximum estimated exposure dose that exceeds their respective chronic LOAEL TRV. The mean estimated exposure doses of chromium (ESQ is 1), zinc (ESQ is 2) and aroclor 1254 (ESQ is 1) were the only COCs that exceed their respective NOAEL TRVs.

The mean concentration of zinc in the reference pond sediment (149 mg/kg) is comparable to the mean concentration in the landfill pond (152 mg/kg). Although aroclor 1254 was not detected in the two reference pond sediment samples, it was detected in four of five upgradient sediment samples collected from the Hoosic River (at higher mean and maximum concentrations than detected in the landfill pond). Note that the landfill ponds are downslope of the Tannery Landfill, which is potentially a former source of PCBs, metals, dioxin, and SVOC releases to the sediment and they are within the floodplain of the Hoosic River, which also contains these compounds. There are not enough data to determine conclusively whether contamination in the Landfill Ponds is related to the Landfill or is a result of overbank floodplain deposition from the Hoosic River and upstream contaminant sources (unrelated to the Pownal Tannery), or both. Overall, the slight exceedences of the NOAEL TRVs and non-exceedences of the LOAEL TRVs indicate that significant impacts to omnivorous birds are not anticipated within the landfill pond.

##### **Mink**

Risks to the mink from modeled COC concentrations of fish, aquatic invertebrates, and vegetation as well as from the ingestion of contaminants present in surface water and sediment within the landfill pond are presented in Table 38. The total mean ESQs for the NOAEL and LOAEL TRVs are 4 and 0.4, respectively. Mean exposure doses of all COCs received by the mink were below the chronic LOAEL TRV. Estimated mean exposure doses of aluminum (ESQ is 3) is the only COC to exceed the mink's chronic NOAEL TRV. However, mean concentrations of aluminum at the reference pond were elevated above the mean landfill pond concentration with comparable maximum concentrations (13,300 mg/kg at the reference pond and 14,000 mg/kg at the landfill pond). Therefore, risk associated with aluminum is not expected to be greater than the background aluminum level. Maximum estimated exposure doses of all other COCs is below unity when compared to the chronic NOAEL TRV. Overall, impacts to piscivorous mammals from detected concentrations of COCs within the landfill pond are not anticipated.



**Table 37. Belted Kingfisher Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	3.17E-06	5.09E-06	2.E-01	4.E-01	2.E-02	4.E-02
Aluminum	109.7	-	3.06E+01	4.24E+01	3.E-01	4.E-01	-	-
Antimony	-	-	4.75E-03	7.13E-03	-	-	-	-
Arsenic	2.46	7.38	9.67E-02	1.04E-01	4.E-02	4.E-02	1.E-02	1.E-02
Barium	20.8	41.7	2.98E-01	3.43E-01	1.E-02	2.E-02	7.E-03	8.E-03
Beryllium	-	-	1.25E-02	1.64E-02	-	-	-	-
Cadmium	1.4	14	5.02E-01	7.62E-01	4.E-01	5.E-01	4.E-02	5.E-02
Chromium	1	5	1.10E+00	1.36E+00	1.E+00	1.E+00	2.E-01	3.E-01
Cobalt	-	-	9.07E-02	9.85E-02	-	-	-	-
Copper	47	61.7	5.86E+00	7.45E+00	1.E-01	2.E-01	9.E-02	1.E-01
Cyanide	0.04	-	0.00E+00	0.00E+00	0.E+00	0.E+00	-	-
Iron	-	-	4.73E+01	6.25E+01	-	-	-	-
Lead	1.13	11.3	8.65E-01	9.88E-01	8.E-01	9.E-01	8.E-02	9.E-02
Manganese	977	-	9.81E+00	3.86E+01	1.E-02	4.E-02	-	-
Mercury	0.45	0.9	8.24E-02	1.78E-01	2.E-01	4.E-01	9.E-02	2.E-01
Nickel	77.4	107	1.30E+00	1.72E+00	2.E-02	2.E-02	1.E-02	2.E-02
Selenium	0.5	1	4.34E-03	1.12E-02	9.E-03	2.E-02	4.E-03	1.E-02
Silver	178	-	1.34E+00	2.28E+00	8.E-03	1.E-02	-	-
Thallium	0.35	-	6.74E-03	3.97E-03	2.E-02	1.E-02	-	-
Vanadium	1.5	2.2	3.03E-02	3.74E-02	2.E-02	2.E-02	1.E-02	2.E-02
Zinc	14.5	131	2.93E+01	3.80E+01	2.E+00	3.E+00	2.E-01	3.E-01
4,4'-DDD	-	-	6.26E-04	1.19E-03	-	-	-	-
4,4'-DDE	0.845	-	9.62E-03	1.38E-02	1.E-02	2.E-02	-	-
Aldrin	0.061	-	7.50E-04	1.79E-03	1.E-02	3.E-02	-	-
alpha-BHC	0.56	2.25	6.93E-04	9.04E-04	1.E-03	2.E-03	3.E-04	4.E-04
alpha-Chlordane	2.14	10.7	9.45E-04	7.31E-04	4.E-04	3.E-04	9.E-05	7.E-05
Aroclor 1242	0.41	-	2.68E-01	3.07E-01	7.E-01	7.E-01	-	-
Aroclor 1254	0.18	1.8	2.48E-01	3.07E-01	1.E+00	2.E+00	1.E-01	2.E-01
beta-BHC	0.56	2.25	5.56E-04	5.94E-04	1.E-03	1.E-03	2.E-04	3.E-04
delta-BHC	0.56	2.25	5.67E-04	8.01E-04	1.E-03	1.E-03	3.E-04	4.E-04
Dieldrin	0.077	-	1.17E-03	1.43E-03	2.E-02	2.E-02	-	-
Endosulfan sulfate	10	-	9.53E-04	1.18E-03	1.E-04	1.E-04	-	-
Endrin aldehyde	0.01	0.1	9.42E-04	1.34E-03	9.E-02	1.E-01	9.E-03	1.E-02

**Table 37. Belted Kingfisher Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	2.14	10.7	9.21E-04	1.31E-03	4.E-04	6.E-04	9.E-05	1.E-04
Heptachlor	65	-	6.10E-04	6.83E-04	9.E-06	1.E-05	-	-
4-Methylphenol	-	-	1.19E-01	1.31E-01	-	-	-	-
Acenaphthylene	see LMW PAHs	see LMW PAHs	1.74E-02	1.06E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	1.88E-02	1.04E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	6.30E-02	1.27E-01	-	-	-	-
Benzo(a)anthracene	-	-	2.93E-02	5.43E-02	-	-	-	-
Benzo(a)pyrene	-	-	3.41E-02	7.02E-02	-	-	-	-
Benzo(b)fluoranthene	-	-	3.09E-02	5.20E-02	-	-	-	-
Benzo(k)fluoranthene	-	-	3.71E-02	7.58E-02	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	4.12E-02	4.70E-02	4.E-02	4.E-02	-	-
Chrysene	-	-	3.47E-02	6.36E-02	-	-	-	-
Dibenzo(a,h)anthracene	-	-	2.51E-02	1.33E-02	-	-	-	-
Fluoranthene	-	-	3.85E-02	7.89E-02	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	2.45E-02	5.26E-02	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	2.33E-02	3.80E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	5.26E-02	8.72E-02	-	-	-	-
Low Molecular Weight PAHs	40	400	5.95E-02	5.90E-02	1.E-03	1.E-03	1.E-04	1.E-04
Acetone	52	-	1.93E-02	4.26E-02	4.E-04	8.E-04	-	-
2-Butanone	-	-	1.53E-02	5.91E-02	-	-	-	-
Toluene	-	-	5.80E-03	2.33E-02	-	-	-	-
<b>TOTAL ESQS</b>					<b>7.E+00</b>	<b>1.E+01</b>	<b>1.E+00</b>	<b>1.E+00</b>

**Table 38. Mink Risk – Landfill Pond**

<b>Contaminant of Concern</b>	<b>NOAEL TRV (mg/kg-BW/day)</b>	<b>LOAEL TRV (mg/kg-BW/day)</b>	<b>Mean Total Dose (mg/kg-BW/day)</b>	<b>Maximum Total Dose (mg/kg-BW/day)</b>	<b>Mean NOAEL ESQ</b>	<b>Maximum NOAEL ESQ</b>	<b>Mean LOAEL ESQ</b>	<b>Maximum LOAEL ESQ</b>
Dioxin TEFs	0.000001	0.00001	1.53E-07	2.72E-07	2.E-01	3.E-01	2.E-02	3.E-02
Aluminum	1.93	19.3	6.17E+00	8.59E+00	3.E+00	4.E+00	3.E-01	4.E-01
Antimony	0.143	1.43	1.20E-03	1.84E-03	8.E-03	1.E-02	8.E-04	1.E-03
Arsenic	4.6	9.3	7.81E-03	8.43E-03	2.E-03	2.E-03	8.E-04	9.E-04
Barium	5.1	-	4.94E-02	5.84E-02	1.E-02	1.E-02	-	-
Beryllium	0.66	-	8.78E-04	1.15E-03	1.E-03	2.E-03	-	-
Cadmium	1	10	3.37E-02	6.52E-02	3.E-02	7.E-02	3.E-03	7.E-03
Chromium	2737	-	1.04E-01	1.36E-01	4.E-05	5.E-05	-	-
Cobalt	-	-	1.04E-02	1.14E-02	-	-	-	-
Copper	11.7	15.14	3.71E-01	5.15E-01	3.E-02	4.E-02	2.E-02	3.E-02
Cyanide	24	-	1.39E-04	1.98E-04	6.E-06	8.E-06	-	-
Iron	-	-	1.30E+01	1.72E+01	-	-	-	-
Lead	8	80	7.28E-02	8.37E-02	9.E-03	1.E-02	9.E-04	1.E-03
Manganese	88	284	2.38E+00	9.68E+00	3.E-02	1.E-01	8.E-03	3.E-02
Mercury	1	-	1.59E-02	3.80E-02	2.E-02	4.E-02	-	-
Nickel	53.5	107	8.75E-02	1.34E-01	2.E-03	3.E-03	8.E-04	1.E-03
Selenium	0.2	0.33	1.10E-03	2.85E-03	6.E-03	1.E-02	3.E-03	9.E-03
Silver	0.375	3.75	7.61E-02	1.30E-01	2.E-01	3.E-01	2.E-02	3.E-02
Thallium	0.0131	-	4.92E-04	2.90E-04	4.E-02	2.E-02	-	-
Vanadium	0.5	5	7.60E-03	9.56E-03	2.E-02	2.E-02	2.E-03	2.E-03
Zinc	200	410	1.71E+00	2.22E+00	9.E-03	1.E-02	4.E-03	5.E-03
4,4'-DDD	-	-	7.30E-05	1.39E-04	-	-	-	-
4,4'-DDE	1	-	2.26E-03	3.24E-03	2.E-03	3.E-03	-	-
Aldrin	0.2	1	1.55E-04	3.70E-04	8.E-04	2.E-03	2.E-04	4.E-04
alpha-BHC	1.6	3.2	1.50E-04	1.96E-04	9.E-05	1.E-04	5.E-05	6.E-05
alpha-Chlordane	4.6	9.2	2.18E-04	1.69E-04	5.E-05	4.E-05	2.E-05	2.E-05
Aroclor 1242	0.069	-	2.26E-02	2.58E-02	3.E-01	4.E-01	-	-
Aroclor 1254	0.14	0.69	2.09E-02	2.58E-02	1.E-01	2.E-01	3.E-02	4.E-02
beta-BHC	0.014	0.14	1.20E-04	1.28E-04	9.E-03	9.E-03	9.E-04	9.E-04
delta-BHC	0.014	0.14	1.22E-04	1.72E-04	9.E-03	1.E-02	9.E-04	1.E-03
Dieldrin	0.02	0.2	2.55E-04	3.13E-04	1.E-02	2.E-02	1.E-03	2.E-03
Endosulfan sulfate	0.15	-	2.07E-04	2.57E-04	1.E-03	2.E-03	-	-

**Table 38. Mink Risk – Landfill Pond**

<b>Contaminant of Concern</b>	<b>NOAEL TRV (mg/kg-BW/day)</b>	<b>LOAEL TRV (mg/kg-BW/day)</b>	<b>Mean Total Dose (mg/kg-BW/day)</b>	<b>Maximum Total Dose (mg/kg-BW/day)</b>	<b>Mean NOAEL ESQ</b>	<b>Maximum NOAEL ESQ</b>	<b>Mean LOAEL ESQ</b>	<b>Maximum LOAEL ESQ</b>
Endrin aldehyde	0.092	0.92	1.98E-04	2.81E-04	2.E-03	3.E-03	2.E-04	3.E-04
gamma-Chlordane	4.6	9.2	1.84E-04	2.62E-04	4.E-05	6.E-05	2.E-05	3.E-05
Heptachlor	0.1	1	1.30E-04	1.52E-04	1.E-03	2.E-03	1.E-04	2.E-04
4-Methylphenol	219.2	-	1.93E-02	2.75E-02	9.E-05	1.E-04	-	-
Acenaphthylene	see LMW PAHs	see LMW PAHs	2.44E-03	1.48E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	2.50E-03	1.38E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	1.35E-02	2.71E-02	3.E-02	6.E-02	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	3.60E-03	6.68E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	4.07E-03	8.37E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	3.68E-03	6.19E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	4.42E-03	9.04E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	8.02E-03	9.14E-03	4.E-04	5.E-04	4.E-05	5.E-05
Chrysene	see HMW PAHs	see HMW PAHs	4.27E-03	7.82E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	2.85E-03	1.51E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	4.97E-03	1.02E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	2.82E-03	6.05E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	3.10E-03	5.06E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	6.80E-03	1.13E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	8.04E-03	7.92E-03	2.E-03	1.E-03	2.E-04	1.E-04
High Molecular Weight PAHs	1	10	3.75E-02	6.72E-02	4.E-02	7.E-02	4.E-03	7.E-03
Acetone	10	50	4.56E-03	1.00E-02	5.E-04	1.E-03	9.E-05	2.E-04
2-Butanone	1771	4571	3.39E-03	1.31E-02	2.E-06	7.E-06	7.E-07	3.E-06
Toluene	26	260	1.19E-03	4.78E-03	5.E-05	2.E-04	5.E-06	2.E-05
<b>TOTAL ESQS</b>					<b>4.E+00</b>	<b>7.E+00</b>	<b>4.E-01</b>	<b>7.E-01</b>

### Canada Goose

The total mean and maximum ESQs for both the NOAEL and LOAEL TRVs are less than unity (see Table 39). Therefore, it is unlikely that the Canada goose (and other herbivorous birds) would be at risk from the detected concentrations of COCs within the sediments of the landfill pond.

### Muskrat

Risks to the muskrat from detected COC concentrations in the landfill pond surface water and sediments (as well as modeled concentrations in aquatic vegetation) are presented in Table 40. The total mean ESQs for the NOAEL and LOAEL TRVs are 55 and 6, respectively. Aluminum is the only COC having an ESQ above unity when comparing mean or maximum estimated exposure doses to the chronic LOAEL or NOAEL TRVs. However, as the mean aluminum concentration is greater within the reference pond sediments, no increased risk from aluminum than attributable to background concentrations is anticipated.

### Spotted Sandpiper

Risk to the insectivorous spotted sandpiper from modeled COC concentrations of aquatic invertebrates as well as from the ingestion of contaminants present in landfill pond surface water and sediment are presented in Table 41. The total mean ESQs for the NOAEL and LOAEL TRVs are 70 and 9, respectively. Mean exposure doses of chromium (ESQ is 3), lead (ESQ is 1) and zinc (ESQ is 1) received by the sandpiper were above the LOAEL TRV. The mean estimated exposure doses of dioxin (ESQ is 1), aluminum (ESQ is 13), cadmium (ESQ is 2), chromium (ESQ is 17), lead (ESQ is 10), vanadium (ESQ is 1), zinc (ESQ is 12), aroclor 1242 (ESQ is 3), and aroclor 1254 (ESQ is 7) exceed the chronic NOAEL TRV.

The mean concentrations of aluminum and vanadium (as well as the maximum vanadium concentration) detected within the reference pond exceed the concentrations within the landfill pond. In addition, mean concentrations of lead and zinc are comparable between the reference pond (51 and 149 mg/kg, respectively) and the landfill pond (55.6 and 152 mg/kg, respectively) indicating risk from all four of these COCs (i.e., aluminum, lead, vanadium and zinc) at the landfill pond is not significantly greater than background risk. Although aroclors 1242 and 1254 were not detected in the two reference pond sediment samples, aroclor 1254 was detected in four of five upgradient sediment samples collected from the Hoosic River (at higher mean and maximum concentrations than detected in the landfill pond). Note that the landfill ponds are downslope of the Tannery Landfill, which is potentially a former source of PCBs, metals, dioxin, and SVOC releases to the sediment and they are within the floodplain of the Hoosic River, which

**Table 39. Canada Goose Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	2.92E-09	4.64E-09	2.E-04	3.E-04	2.E-05	3.E-05
Aluminum	109.7	-	1.10E+00	1.52E+00	1.E-02	1.E-02	-	-
Antimony	-	-	7.76E-07	1.27E-06	-	-	-	-
Arsenic	5.14	12.84	6.19E-04	6.67E-04	1.E-04	1.E-04	5.E-05	5.E-05
Barium	20.8	41.7	8.99E-03	1.03E-02	4.E-04	5.E-04	2.E-04	2.E-04
Beryllium	-	-	4.51E-05	5.92E-05	-	-	-	-
Cadmium	1.4	14	4.09E-04	5.60E-04	3.E-04	4.E-04	3.E-05	4.E-05
Chromium	1	5	9.90E-03	1.18E-02	1.E-02	1.E-02	2.E-03	2.E-03
Cobalt	-	-	1.35E-03	1.46E-03	-	-	-	-
Copper	47	61.7	6.68E-03	8.26E-03	1.E-04	2.E-04	1.E-04	1.E-04
Cyanide	0.04	-	6.52E-04	4.87E-05	2.E-02	1.E-03	-	-
Iron	-	-	2.53E+00	3.18E+00	-	-	-	-
Lead	1.13	11.3	6.32E-03	7.23E-03	6.E-03	6.E-03	6.E-04	6.E-04
Manganese	977	-	8.46E-02	1.00E-01	9.E-05	1.E-04	-	-
Mercury	0.45	0.9	7.74E-05	1.12E-04	2.E-04	2.E-04	9.E-05	1.E-04
Nickel	77.4	107	2.48E-03	3.10E-03	3.E-05	4.E-05	2.E-05	3.E-05
Silver	178	-	5.33E-04	9.09E-04	3.E-06	5.E-06	-	-
Thallium	0.35	-	2.86E-05	1.69E-05	8.E-05	5.E-05	-	-
Vanadium	11.4	-	1.48E-03	1.82E-03	1.E-04	2.E-04	-	-
Zinc	14.5	131	4.41E-02	5.72E-02	3.E-03	4.E-03	3.E-04	4.E-04
4,4'-DDD	-	-	4.84E-07	9.20E-07	-	-	-	-
4,4'-DDE	0.845	-	8.35E-07	1.20E-06	1.E-06	1.E-06	-	-
Aldrin	0.061	-	2.40E-07	5.73E-07	4.E-06	9.E-06	-	-
alpha-BHC	0.56	2.25	2.98E-07	3.89E-07	5.E-07	7.E-07	1.E-07	2.E-07
alpha-Chlordane	2.14	10.7	1.30E-07	1.01E-07	6.E-08	5.E-08	1.E-08	9.E-09
Aroclor 1242	0.41	-	1.79E-05	2.05E-05	4.E-05	5.E-05	-	-
Aroclor 1254	0.18	1.8	1.42E-05	1.76E-05	8.E-05	1.E-04	8.E-06	1.E-05
beta-BHC	0.56	2.25	2.30E-07	2.46E-07	4.E-07	4.E-07	1.E-07	1.E-07
delta-BHC	0.56	2.25	2.16E-07	3.05E-07	4.E-07	5.E-07	1.E-07	1.E-07
Dieldrin	0.077	-	5.48E-07	6.72E-07	7.E-06	9.E-06	-	-
Endosulfan sulfate	10	-	4.19E-07	5.19E-07	4.E-08	5.E-08	-	-
Endrin aldehyde	0.3	-	3.19E-07	4.53E-07	1.E-06	2.E-06	-	-

**Table 39. Canada Goose Risk – Landfill Pond**

<b>Contaminant of Concern</b>	<b>NOAEL TRV (mg/kg-BW/day)</b>	<b>LOAEL TRV (mg/kg-BW/day)</b>	<b>Mean Total Dose (mg/kg-BW/day)</b>	<b>Maximum Total Dose (mg/kg-BW/day)</b>	<b>Mean NOAEL ESQ</b>	<b>Maximum NOAEL ESQ</b>	<b>Mean LOAEL ESQ</b>	<b>Maximum LOAEL ESQ</b>
gamma-Chlordane	2.14	10.7	2.21E-07	3.15E-07	1.E-07	1.E-07	2.E-08	3.E-08
Heptachlor	65	-	2.20E-07	2.62E-07	3.E-09	4.E-09	-	-
4-Methylphenol	-	-	1.99E-04	3.18E-04	-	-	-	-
Acenaphthylene	see LMW PAHs	see LMW PAHs	2.35E-05	1.42E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	1.97E-05	1.09E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	2.54E-04	5.11E-04	-	-	-	-
Benzo(a)anthracene	-	-	2.45E-05	4.55E-05	-	-	-	-
Benzo(a)pyrene	-	-	2.67E-05	5.49E-05	-	-	-	-
Benzo(b)fluoranthene	-	-	2.41E-05	4.06E-05	-	-	-	-
Benzo(k)fluoranthene	-	-	2.90E-05	5.92E-05	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	2.54E-05	2.90E-05	2.E-05	3.E-05	-	-
Chrysene	-	-	2.91E-05	5.32E-05	-	-	-	-
Dibenzo(a,h)anthracene	-	-	1.76E-05	9.36E-06	-	-	-	-
Fluoranthene	-	-	3.65E-05	7.48E-05	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	1.78E-05	3.81E-05	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	2.44E-05	3.99E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	5.01E-05	8.30E-05	-	-	-	-
Low Molecular Weight PAHs	40	400	6.76E-05	6.50E-05	2.E-06	2.E-06	2.E-07	2.E-07
Acetone	52	-	7.15E-04	1.58E-03	1.E-05	3.E-05	-	-
2-Butanone	-	-	1.73E-04	6.70E-04	-	-	-	-
Toluene	-	-	2.72E-05	1.09E-04	-	-	-	-
<b>TOTAL ESQS</b>					<b>5.E-02</b>	<b>4.E-02</b>	<b>4.E-03</b>	<b>4.E-03</b>

**Table 40. Muskrat Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.83E-06	3.20E-07	2.E-01	3.E-01	2.E-02	3.E-02
Aluminum	1.93	19.3	1.05E+02	1.45E+02	5.4E+01	7.5E+01	5.E+00	8.E+00
Antimony	0.143	1.43	5.14E-05	8.43E-05	4.E-04	6.E-04	4.E-05	6.E-05
Arsenic	4.6	9.3	6.30E-02	6.80E-02	1.E-02	1.E-02	7.E-03	7.E-03
Barium	5.1	-	1.08E+00	1.23E+00	2.E-01	2.E-01	-	-
Beryllium	0.66	-	4.34E-03	5.69E-03	7.E-03	9.E-03	-	-
Cadmium	1	10	6.63E-02	9.07E-02	7.E-02	9.E-02	7.E-03	9.E-03
Chromium	2737	-	9.47E-01	1.13E+00	3.E-04	4.E-04	-	-
Cobalt	-	-	1.32E-01	1.44E-01	-	-	-	-
Copper	11.7	15.14	9.97E-01	1.23E+00	9.E-02	1.E-01	7.E-02	8.E-02
Cyanide	24	-	3.23E-03	4.59E-03	1.E-04	2.E-04	-	-
Iron	-	-	2.40E+02	3.02E+02	-	-	-	-
Lead	8	80	6.50E-01	7.43E-01	8.E-02	9.E-02	8.E-03	9.E-03
Manganese	88	284	1.12E+01	1.33E+01	1.E-01	2.E-01	4.E-02	5.E-02
Mercury	13.2	-	1.42E-02	2.05E-02	1.E-03	2.E-03	-	-
Nickel	53.5	107	2.61E-01	3.27E-01	5.E-03	6.E-03	2.E-03	3.E-03
Silver	0.375	3.75	7.95E-02	1.36E-01	2.E-01	4.E-01	2.E-02	4.E-02
Thallium	0.0131	-	2.72E-03	1.60E-03	2.E-01	1.E-01	-	-
Vanadium	0.5	5	1.44E-01	1.77E-01	3.E-01	4.E-01	3.E-02	4.E-02
Zinc	200	410	9.08E+00	1.18E+01	5.E-02	6.E-02	2.E-02	3.E-02
4,4'-DDD	-	-	4.66E-05	8.85E-05	-	-	-	-
4,4'-DDE	1	-	7.92E-05	1.13E-04	8.E-05	1.E-04	-	-
Aldrin	0.2	1	2.42E-05	5.76E-05	1.E-04	3.E-04	2.E-05	6.E-05
alpha-BHC	1.6	3.2	4.06E-05	5.29E-05	3.E-05	3.E-05	1.E-05	2.E-05
alpha-Chlordane	4.6	9.2	1.26E-05	9.77E-06	3.E-06	2.E-06	1.E-06	1.E-06
Aroclor 1242	0.069	-	2.18E-03	2.49E-03	3.E-02	4.E-02	-	-
Aroclor 1254	0.068	0.68	1.38E-03	1.70E-03	2.E-02	3.E-02	2.E-03	3.E-03
beta-BHC	1.6	3.2	3.01E-05	3.22E-05	2.E-05	2.E-05	9.E-06	1.E-05
delta-BHC	1.6	3.2	2.61E-05	3.69E-05	2.E-05	2.E-05	8.E-06	1.E-05
Dieldrin	0.02	0.2	8.01E-05	9.82E-05	4.E-03	5.E-03	4.E-04	5.E-04
Endosulfan sulfate	0.15	-	5.81E-05	7.20E-05	4.E-04	5.E-04	-	-
Endrin aldehyde	0.092	0.92	3.40E-05	4.82E-05	4.E-04	5.E-04	4.E-05	5.E-05
gamma-Chlordane	4.6	9.2	2.10E-05	2.98E-05	5.E-06	6.E-06	2.E-06	3.E-06
Heptachlor	0.0025	-	2.51E-05	2.98E-05	1.E-02	1.E-02	-	-



**Table 40. Muskrat Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
4-Methylphenol	219.2	-	4.60E-02	7.35E-02	2.E-04	3.E-04	-	-
Acenaphthylene	see LMW PAHs	see LMW PAHs	3.21E-03	1.95E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	2.22E-03	1.23E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	6.27E-02	1.26E-01	1.E-01	3.E-01	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	2.42E-03	4.49E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	2.58E-03	5.30E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	2.33E-03	3.92E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	2.80E-03	5.72E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	3.21E-03	3.66E-03	2.E-04	2.E-04	2.E-05	2.E-05
Chrysene	see HMW PAHs	see HMW PAHs	2.86E-03	5.25E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	1.68E-03	8.90E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	3.83E-03	7.85E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	1.70E-03	3.64E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	2.75E-03	4.49E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	5.26E-03	8.73E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	8.18E-03	7.67E-03	2.E-03	1.E-03	2.E-04	1.E-04
High Molecular Weight PAHs	1	10	2.55E-02	4.58E-02	3.E-02	5.E-02	3.E-03	5.E-03
Acetone	10	50	1.93E-01	4.25E-01	2.E-02	4.E-02	4.E-03	9.E-03
2-Butanone	1771	4571	4.56E-02	1.76E-01	3.E-05	1.E-04	1.E-05	4.E-05
Toluene	26	260	6.85E-03	2.75E-02	3.E-04	1.E-03	3.E-05	1.E-04
<b>TOTAL ESQS</b>					<b>5.5E+01</b>	<b>7.7E+01</b>	<b>6.E+00</b>	<b>8.E+00</b>

**Table 41. Spotted Sandpiper Risk – Landfill Pond**

<b>Contaminant of Concern</b>	<b>NOAEL TRV (mg/kg-BW/day)</b>	<b>LOAEL TRV (mg/kg-BW/day)</b>	<b>Mean Total Dose (mg/kg-BW/day)</b>	<b>Maximum Total Dose (mg/kg-BW/day)</b>	<b>Mean NOAEL ESQ</b>	<b>Maximum NOAEL ESQ</b>	<b>Mean LOAEL ESQ</b>	<b>Maximum LOAEL ESQ</b>
Dioxin TEFs	0.000014	0.00014	2.00E-05	3.20E-05	1.E+00	2.E+00	1.E-01	2.E-01
Aluminum	109.7	-	1.41E+03	1.95E+03	1.3E+01	1.8E+01	-	-
Antimony	-	-	8.91E-05	1.46E-04	-	-	-	-
Arsenic	2.46	7.38	1.20E+00	1.29E+00	5.E-01	5.E-01	2.E-01	2.E-01
Barium	20.8	41.7	1.03E+01	1.18E+01	5.E-01	6.E-01	2.E-01	3.E-01
Beryllium	-	-	1.19E-01	1.55E-01	-	-	-	-
Cadmium	1.4	14	2.89E+00	3.95E+00	2.E+00	3.E+00	2.E-01	3.E-01
Chromium	1	5	1.71E+01	2.03E+01	1.7E+01	2.0E+01	3.E+00	4.E+00
Cobalt	-	-	1.99E+00	2.16E+00	-	-	-	-
Copper	47	61.7	3.64E+01	4.49E+01	8.E-01	1.E+00	6.E-01	7.E-01
Cyanide	0.04	-	3.90E-02	5.54E-02	1.E+00	1.E+00	-	-
Iron	-	-	3.11E+03	3.91E+03	-	-	-	-
Lead	1.13	11.3	1.15E+01	1.32E+01	1.0E+01	1.2E+01	1.E+00	1.E+00
Manganese	977	-	8.53E+01	1.01E+02	9.E-02	1.E-01	-	-
Mercury	0.45	0.9	1.86E-01	2.69E-01	4.E-01	6.E-01	2.E-01	3.E-01
Nickel	77.4	107	9.56E+00	1.20E+01	1.E-01	2.E-01	9.E-02	1.E-01
Silver	178	-	7.68E+00	1.31E+01	4.E-02	7.E-02	-	-
Thallium	0.35	-	6.90E-02	4.07E-02	2.E-01	1.E-01	-	-
Vanadium	1.5	2.2	1.82E+00	2.23E+00	1.E+00	1.E+00	8.E-01	1.E+00
Zinc	14.5	131	1.78E+02	2.31E+02	1.2E+01	1.6E+01	1.E+00	2.E+00
4,4'-DDD	-	-	2.95E-03	5.61E-03	-	-	-	-
4,4'-DDE	0.845	-	5.80E-03	8.31E-03	7.E-03	1.E-02	-	-
Aldrin	0.061	-	1.25E-03	2.98E-03	2.E-02	5.E-02	-	-
alpha-BHC	0.56	2.25	9.83E-04	1.28E-03	2.E-03	2.E-03	4.E-04	6.E-04
alpha-Chlordane	2.14	10.7	7.58E-04	5.87E-04	4.E-04	3.E-04	7.E-05	5.E-05
Aroclor 1242	0.41	-	1.27E+00	1.45E+00	3.E+00	4.E+00	-	-
Aroclor 1254	0.18	1.8	1.17E+00	1.45E+00	7.E+00	8.E+00	7.E-01	8.E-01
beta-BHC	0.56	2.25	7.99E-04	8.53E-04	1.E-03	2.E-03	4.E-04	4.E-04
delta-BHC	0.56	2.25	8.40E-04	1.19E-03	2.E-03	2.E-03	4.E-04	5.E-04
Dieldrin	0.077	-	1.62E-03	1.99E-03	2.E-02	3.E-02	-	-
Endosulfan sulfate	10	-	1.34E-03	1.66E-03	1.E-04	2.E-04	-	-
Endrin aldehyde	0.01	0.1	1.49E-03	2.12E-03	1.E-01	2.E-01	1.E-02	2.E-02

**Table 41. Spotted Sandpiper Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	2.14	10.7	1.63E-03	2.31E-03	8.E-04	1.E-03	2.E-04	2.E-04
Heptachlor	65	-	9.27E-04	1.10E-03	1.E-05	2.E-05	-	-
4-Methylphenol	-	-	3.59E-01	2.51E-01	-	-	-	-
Acenaphthylene	see LMW PAHs	see LMW PAHs	7.67E-02	4.65E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	8.41E-02	4.64E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	1.16E-01	2.34E-01	-	-	-	-
Benzo(a)anthracene	-	-	1.35E-01	2.50E-01	-	-	-	-
Benzo(a)pyrene	-	-	1.59E-01	3.27E-01	-	-	-	-
Benzo(b)fluoranthene	-	-	1.44E-01	2.42E-01	-	-	-	-
Benzo(k)fluoranthene	-	-	1.73E-01	3.53E-01	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	9.32E-02	1.06E-01	8.E-02	1.E-01	-	-
Chrysene	-	-	1.60E-01	2.93E-01	-	-	-	-
Dibenzo(a,h)anthracene	-	-	1.19E-01	6.30E-02	-	-	-	-
Fluoranthene	-	-	1.74E-01	3.58E-01	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	1.15E-01	2.48E-01	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	1.04E-01	1.70E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	2.38E-01	3.95E-01	-	-	-	-
Low Molecular Weight PAHs	40	400	2.65E-01	2.63E-01	7.E-03	7.E-03	7.E-04	7.E-04
Acetone	52	-	3.12E-02	6.89E-02	6.E-04	1.E-03	-	-
2-Butanone	-	-	2.65E-02	1.02E-01	-	-	-	-
Toluene	-	-	1.18E-02	4.76E-02	-	-	-	-
<b>TOTAL ESQS</b>					<b>7.0E+01</b>	<b>8.8E+01</b>	<b>9.E+00</b>	<b>1.1E+01</b>

also contains these compounds. There are not enough data to determine conclusively whether contamination in the Landfill Ponds is related to the Landfill or is a result of overbank floodplain deposition from the Hoosic River and upstream contaminant sources (unrelated to the Pownal Tannery), or both.

Although the estimated exposure doses of chromium and cadmium received by the sandpiper at the landfill pond indicates potential risk, it should be noted that these metals may not be highly bioavailable to aquatic invertebrates (consumed by sandpiper) due to the elevated AVS concentrations detected within the landfill pond. Dioxins are unlikely to present a significant risk to the sandpiper as the estimated exposure dose was slightly greater than the NOAEL TRV and less than the LOAEL TRV. Chromium, if bioavailable, appears to present the greatest risk to insectivorous birds as the mean exposure dose exceeds the chronic NOAEL and LOAEL TRVs.

#### Little Brown Bat

Risk to the insectivorous little brown bat from estimated COC concentrations in emerging aquatic invertebrates (estimated from landfill pond sediment concentrations) are presented in Table 42. The total mean ESQs for the NOAEL and LOAEL TRVs are 130 and 13, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxin (ESQ is 1), aluminum (ESQ is 7), copper (ESQ is 2), silver (ESQ is 2) and aroclor 1254 (ESQ is 1). Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxin (ESQ is 10), aluminum (ESQ is 69), cadmium (ESQ is 2), copper (ESQ is 2), silver (ESQ is 16), thallium (ESQ is 2), aroclor 1242 (ESQ is 15) and aroclor 1254 (ESQ is 14).

The mean concentration of aluminum detected within the reference pond sediments exceeds the mean concentration within the landfill pond sediment while mean concentrations of copper are comparable between the landfill pond (42.6 mg/kg) and the reference pond (39.8 mg/kg). Risk from these COCs are unlikely to be significantly above background risk levels. As stated above, aroclor 1254 was detected in four of five upgradient sediment samples collected from the Hoosic River (at higher mean and maximum concentrations than detected in the landfill pond). Note that the landfill ponds are downslope of the Tannery Landfill, which is potentially a former source of PCBs, metals, dioxin, and SVOC releases to the sediment and they are within the floodplain of the Hoosic River, which also contains these compounds. There are not enough data to determine conclusively whether contamination in the Landfill Ponds is related to the Landfill or is a result of overbank floodplain deposition from the Hoosic River and upstream contaminant sources (unrelated to the Pownal Tannery), or both.

The detected concentrations of dioxins and silver have the greatest likelihood of resulting in risk (above background) to insectivorous mammals foraging at the landfill pond as estimated mean and maximum exposure doses exceed both chronic NOAEL and LOAEL TRVs.

**Table 42. Little Brown Bat Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.01E-05	1.80E-05	1.0E+01	1.8E+01	1.E+00	2.E+00
Aluminum	1.93	19.3	1.34E+02	1.85E+02	6.9E+01	9.6E+01	7.E+00	1.E+01
Antimony	0.143	1.43	3.35E-05	5.50E-05	2.E-04	4.E-04	2.E-05	4.E-05
Arsenic	4.6	9.3	4.23E-01	4.56E-01	9.E-02	1.E-01	5.E-02	5.E-02
Barium	5.1	-	1.27E+00	1.46E+00	2.E-01	3.E-01	-	-
Beryllium	0.66	-	5.45E-02	7.15E-02	8.E-02	1.E-01	-	-
Cadmium	1	10	2.09E+00	2.86E+00	2.E+00	3.E+00	2.E-01	3.E-01
Chromium	2737	-	4.75E+00	5.66E+00	2.E-03	2.E-03	-	-
Cobalt	-	-	3.96E-01	4.30E-01	-	-	-	-
Copper	11.7	15.14	2.51E+01	3.09E+01	2.E+00	3.E+00	2.E+00	2.E+00
Cyanide	24	-	0.00E+00	0.00E+00	0.E+00	0.E+00	-	-
Iron	-	-	2.03E+03	2.55E+02	-	-	-	-
Lead	8	80	3.78E+00	4.32E+00	5.E-01	5.E-01	5.E-02	5.E-02
Manganese	88	284	8.46E+00	1.00E+01	1.E-01	1.E-01	3.E-02	4.E-02
Mercury	13.2	-	1.14E-01	1.65E-01	9.E-03	1.E-02	-	-
Nickel	53.5	107	5.57E+00	6.96E+00	1.E-01	1.E-01	5.E-02	7.E-02
Silver	0.375	3.75	5.84E+00	9.96E+00	1.6E+01	2.7E+01	2.E+00	3.E+00
Thallium	0.0131	-	1.74E-02	1.74E-02	1.E+00	1.E+00	-	-
Vanadium	0.5	5	1.32E-01	1.63E-01	3.E-01	3.E-01	3.E-02	3.E-02
Zinc	200	410	1.28E+02	1.66E+02	6.E-01	8.E-01	3.E-01	4.E-01
4,4'-DDD	-	-	1.94E-03	3.68E-03	-	-	-	-
4,4'-DDE	1	-	3.91E-03	5.60E-03	4.E-03	6.E-03	-	-
Aldrin	0.2	1	7.93E-04	1.89E-03	4.E-03	9.E-03	8.E-04	2.E-03
alpha-BHC	1.6	3.2	5.82E-04	7.59E-04	4.E-04	5.E-04	2.E-04	2.E-04
alpha-Chlordane	4.6	9.2	3.81E-04	3.81E-04	8.E-05	8.E-05	4.E-05	4.E-05
Aroclor 1242	0.069	-	1.01E+00	1.15E+00	1.5E+01	1.7E+01	-	-
Aroclor 1254	0.068	0.68	9.30E-01	1.15E+00	1.4E+01	1.7E+01	1.E+00	2.E+00
beta-BHC	1.6	3.2	4.76E-04	5.08E-04	3.E-04	3.E-04	1.E-04	2.E-04
delta-BHC	1.6	3.2	5.07E-04	7.16E-04	3.E-04	4.E-04	2.E-04	2.E-04
Dieldrin	0.02	0.2	9.51E-04	1.17E-03	5.E-02	6.E-02	5.E-03	6.E-03
Endosulfan sulfate	0.15	-	7.93E-04	9.82E-04	5.E-03	7.E-03	-	-
Endrin aldehyde	0.092	0.92	9.28E-04	1.32E-03	1.E-02	1.E-02	1.E-03	1.E-03
gamma-Chlordane	4.6	9.2	1.11E-03	1.57E-03	2.E-04	3.E-04	1.E-04	2.E-04
Heptachlor	0.0025	-	5.67E-04	6.73E-04	2.E-01	3.E-01	-	-
4-Methylphenol	219.2	-	1.34E-01	1.34E-01	6.E-04	6.E-04	-	-

**Table 42. Little Brown Bat Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Accenaphthylene	see LMW PAHs	see LMW PAHs	2.75E-02	2.75E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	2.85E-02	2.85E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	6.05E-02	1.22E-01	1.E-01	3.E-01	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	8.66E-02	1.61E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	1.04E-01	2.13E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	9.39E-02	1.58E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	1.13E-01	2.31E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	5.59E-02	6.37E-02	3.E-03	3.E-03	3.E-04	3.E-04
Chrysene	see HMW PAHs	see HMW PAHs	1.03E-01	1.88E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	4.21E-02	4.21E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	1.09E-01	2.23E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	7.67E-02	1.65E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	6.39E-02	1.04E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	1.49E-01	2.47E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	1.20E-01	1.60E-01	2.E-02	3.E-02	2.E-03	3.E-03
High Molecular Weight PAHs	1	10	8.77E-01	1.63E+00	9.E-01	2.E+00	9.E-02	2.E-01
Acetone	10	50	1.44E-02	3.16E-02	1.E-03	3.E-03	3.E-04	6.E-04
2-Butanone	1771	4571	1.30E-02	5.03E-02	7.E-06	3.E-05	3.E-06	1.E-05
Toluene	26	260	6.65E-03	2.67E-02	3.E-04	1.E-03	3.E-05	1.E-04
				<b>TOTAL ESQS</b>	1.3E+02	1.9E+02	1.3E+01	1.9E+01

### Mallard

Risks to the omnivorous mallard from detected COC concentrations in the landfill pond surface water and sediments (as well as modeled concentrations in aquatic vegetation and invertebrates) are presented in Table 43. The total mean ESQs for the NOAEL and LOAEL TRVs are 0.5 and 0.06, respectively. No COC has an ESQ above unity indicating little potential risk to waterfowl from contaminants detected within the landfill surface water and sediments.

### Raccoon

Risks to the omnivorous raccoon from modeled COC concentrations of aquatic vegetation and invertebrates as well as from the ingestion of contaminants present in surface water and sediment are presented in Table 44. The total mean ESQs for the NOAEL and LOAEL TRVs are 35 and 4, respectively. Mean exposure doses of all COCs received by the raccoon were below the chronic LOAEL and NOAEL TRVs except for aluminum (ESQs are 3 and 32 for LOAEL and NOAEL TRVs, respectively). The mean concentration of aluminum is greater in the reference pond sediment than in the sediment of the landfill pond. Therefore, risk from aluminum is not likely to be significantly greater than the risk from background aluminum concentrations.

#### **4.4.5 Landfill Wet Meadow/Seeps**

Risks to wildlife that forage within the wetland habitats provided by the wet meadow and seepage areas located downgradient from the landfill were evaluated by modeling exposure to the following three indicator species: the meadow vole, American woodcock and short-tailed shrew. Results of this analysis is presented below for each of the indicator species.

### Meadow Vole

The estimated mean chronic NOAEL and LOAEL ESQs for the meadow vole are 44 and 4, respectively (Table 45). The mean estimated exposure dose of aluminum (ESQ is 4) is the only COC that exceeds its respective LOAEL TRV. The mean estimated exposure dose of aluminum (ESQ is 43) is the only COC (including maximum concentrations of all COCs) that exceeds its respective NOAEL TRV. The mean concentration of aluminum is greater within the background wetland surface soil sample although the maximum aluminum concentration at the wet meadow/seep area (12,900 mg/kg) exceeds the maximum wetland reference aluminum concentration (11,300 mg/kg). Overall, it does not appear herbivorous mammals are at significant risk from the detected concentrations of COCs present in the surface soils of the wet meadow and seeps.

**Table 43. Mallard Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	2.07E-07	3.33E-07	1.E-02	2.E-02	1.E-03	2.E-03
Aluminum	109.7	-	2.98E+00	4.12E+00	3.E-02	4.E-02	-	-
Antimony	-	-	1.22E-06	2.00E-06	-	-	-	-
Arsenic	5.14	12.84	6.99E-03	7.54E-03	1.E-03	1.E-03	5.E-04	6.E-04
Barium	20.8	41.7	2.83E-02	3.25E-02	1.E-03	2.E-03	7.E-04	8.E-04
Beryllium	-	-	8.70E-04	1.14E-03	-	-	-	-
Cadmium	1.4	14	3.24E-02	4.43E-02	2.E-02	3.E-02	2.E-03	3.E-03
Chromium	1	5	8.09E-02	9.64E-02	8.E-02	1.E-01	2.E-02	2.E-02
Cobalt	-	-	7.21E-03	7.83E-03	-	-	-	-
Copper	47	61.7	3.90E-01	4.81E-01	8.E-03	1.E-02	6.E-03	8.E-03
Cyanide	0.04	-	2.91E-05	4.14E-05	7.E-04	1.E-03	-	-
Iron	-	-	5.26E+00	6.60E+00	-	-	-	-
Lead	1.13	11.3	6.33E-02	7.23E-02	6.E-02	6.E-02	6.E-03	6.E-03
Manganese	977	-	2.20E-01	2.61E-01	2.E-04	3.E-04	-	-
Mercury	0.45	0.9	1.85E-03	2.67E-03	4.E-03	6.E-03	2.E-03	3.E-03
Nickel	77.4	107	8.71E-02	1.09E-01	1.E-03	1.E-03	8.E-04	1.E-03
Silver	178	-	8.96E-02	1.53E-01	5.E-04	9.E-04	-	-
Thallium	0.35	-	2.79E-04	2.79E-04	8.E-04	8.E-04	-	-
Vanadium	11.4	-	3.30E-03	4.06E-03	3.E-04	4.E-04	-	-
Zinc	14.5	131	2.02E+00	2.62E+00	1.E-01	2.E-01	2.E-02	2.E-02
4,4'-DDD	-	-	2.99E-05	5.69E-05	-	-	-	-
4,4'-DDE	0.845	-	6.02E-05	8.63E-05	7.E-05	1.E-04	-	-
Aldrin	0.061	-	1.23E-05	2.93E-05	2.E-04	5.E-04	-	-
alpha-BHC	0.56	2.25	9.20E-06	1.20E-05	2.E-05	2.E-05	4.E-06	5.E-06
alpha-Chlordane	2.14	10.7	5.90E-06	5.90E-06	3.E-06	3.E-06	6.E-07	6.E-07
Aroclor 1242	0.41	-	1.53E-02	1.75E-02	4.E-02	4.E-02	-	-
Aroclor 1254	0.18	1.8	1.42E-02	1.75E-02	8.E-02	1.E-01	8.E-03	1.E-02
beta-BHC	0.56	2.25	7.49E-06	8.00E-06	1.E-05	1.E-05	3.E-06	4.E-06
delta-BHC	0.56	2.25	7.95E-06	1.12E-05	1.E-05	2.E-05	4.E-06	5.E-06
Dieldrin	0.077	-	1.51E-05	1.85E-05	2.E-04	2.E-04	-	-
Endosulfan sulfate	10	-	1.25E-05	1.55E-05	1.E-06	2.E-06	-	-



**Table 43. Mallard Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endrin aldehyde	0.3	-	1.44E-05	2.05E-05	5.E-05	7.E-05	-	-
gamma-Chlordane	2.14	10.7	1.70E-05	2.42E-05	8.E-06	1.E-05	2.E-06	2.E-06
Heptachlor	65	-	8.85E-06	1.05E-05	1.E-07	2.E-07	-	-
4-Methylphenol	-	-	2.57E-03	2.57E-03	-	-	-	-
Acenaphthylene	see LMW PAHs	see LMW PAHs	4.34E-04	4.34E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	4.44E-04	4.44E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	1.36E-03	2.74E-03	-	-	-	-
Benzo(a)anthracene	-	-	1.34E-03	2.49E-03	-	-	-	-
Benzo(a)pyrene	-	-	1.60E-03	3.30E-03	-	-	-	-
Benzo(b)fluoranthene	-	-	1.45E-03	2.44E-03	-	-	-	-
Benzo(k)fluoranthene	-	-	1.74E-03	3.56E-03	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	8.78E-04	1.00E-03	8.E-04	9.E-04	-	-
Chrysene	-	-	1.59E-03	2.92E-03	-	-	-	-
Dibenzo(a,h)anthracene	-	-	6.50E-04	6.50E-04	-	-	-	-
Fluoranthene	-	-	1.69E-03	3.47E-03	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	1.18E-03	2.54E-03	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	9.96E-04	1.63E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	2.31E-03	3.83E-03	-	-	-	-
Low Molecular Weight PAHs	40	400	1.87E-03	2.51E-03	5.E-05	6.E-05	5.E-06	6.E-06
Acetone	52	-	1.55E-03	3.42E-03	3.E-05	7.E-05	-	-
2-Butanone	-	-	5.15E-04	1.99E-03	-	-	-	-
Toluene	-	-	1.49E-04	6.00E-04	-	-	-	-
				<b>TOTAL ESQS</b>	5.E-01	6.E-01	6.E-02	7.E-02

**Table 44. Raccoon Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	5.76E-07	1.06E-06	6.E-01	1.E+00	6.E-02	1.E-01
Aluminum	1.93	19.3	6.08E+01	8.40E+01	3.2E+01	4.4E+01	3.E+00	4.E+00
Antimony	0.143	1.43	1.30E-05	2.14E-05	9.E-05	1.E-04	9.E-06	1.E-05
Arsenic	4.6	9.3	5.01E-02	5.40E-02	1.E-02	1.E-02	5.E-03	6.E-03
Barium	5.1	-	4.73E-01	5.43E-01	9.E-02	1.E-01	-	-
Beryllium	0.66	-	4.82E-03	6.31E-03	7.E-03	1.E-02	-	-
Cadmium	1	10	1.16E-01	1.59E-01	1.E-01	2.E-01	1.E-02	2.E-02
Chromium	2737	-	7.14E-01	8.51E-01	3.E-04	3.E-04	-	-
Cobalt	-	-	8.48E-02	9.20E-02	-	-	-	-
Copper	11.7	15.14	1.47E+00	1.82E+00	1.E-01	2.E-01	1.E-01	1.E-01
Cyanide	24	-	1.70E-03	2.41E-03	7.E-05	1.E-04	-	-
Iron	-	-	1.34E+02	1.69E+02	-	-	-	-
Lead	8	80	4.85E-01	5.55E-01	6.E-02	7.E-02	6.E-03	7.E-03
Manganese	88	284	4.12E+00	4.89E+00	5.E-02	6.E-02	1.E-02	2.E-02
Mercury	1	-	8.32E-03	1.20E-02	8.E-03	1.E-02	-	-
Nickel	53.5	107	3.84E-01	4.80E-01	7.E-03	9.E-03	4.E-03	4.E-03
Silver	0.375	3.75	3.00E-01	5.12E-01	8.E-01	1.E+00	8.E-02	1.E-01
Thallium	0.0131	-	1.66E-03	1.66E-03	1.E-01	1.E-01	-	-
Vanadium	0.5	5	7.88E-02	9.70E-02	2.E-01	2.E-01	2.E-02	2.E-02
Zinc	200	410	7.61E+00	9.85E+00	4.E-02	5.E-02	2.E-02	2.E-02
4,4'-DDD	-	-	1.16E-04	2.20E-04	-	-	-	-
4,4'-DDE	1	-	2.27E-04	3.25E-04	2.E-04	3.E-04	-	-
Aldrin	0.2	1	4.94E-05	1.18E-04	2.E-04	6.E-04	5.E-05	1.E-04
alpha-BHC	1.6	3.2	4.08E-05	5.31E-05	3.E-05	3.E-05	1.E-05	2.E-05
alpha-Chlordane	4.6	9.2	2.31E-05	2.31E-05	5.E-06	5.E-06	3.E-06	3.E-06
Aroclor 1242	0.069	-	4.87E-02	5.56E-02	7.E-01	8.E-01	-	-
Aroclor 1254	0.14	0.69	4.50E-02	5.55E-02	3.E-01	4.E-01	7.E-02	8.E-02
beta-BHC	0.014	0.14	3.28E-05	3.51E-05	2.E-03	3.E-03	2.E-04	3.E-04
delta-BHC	0.014	0.14	3.41E-05	4.81E-05	2.E-03	3.E-03	2.E-04	3.E-04
Dieldrin	0.02	0.2	6.85E-05	8.39E-05	3.E-03	4.E-03	3.E-04	4.E-04
Endosulfan sulfate	0.15	-	5.59E-05	6.93E-05	4.E-04	5.E-04	-	-
Endrin aldehyde	0.092	0.92	5.94E-05	8.43E-05	6.E-04	9.E-04	6.E-05	9.E-05
gamma-Chlordane	4.6	9.2	6.36E-05	9.04E-05	1.E-05	2.E-05	7.E-06	1.E-05
Heptachlor	0.1	1	3.73E-05	4.43E-05	4.E-04	4.E-04	4.E-05	4.E-05
4-Methylphenol	219.2	-	1.62E-02	1.62E-02	7.E-05	7.E-05	-	-

**Table 44. Raccoon Risk – Landfill Pond**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Acenaphthylene	see LMW PAHs	see LMW PAHs	1.93E-03	1.93E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	1.86E-03	1.86E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	1.01E-02	2.04E-02	2.E-02	4.E-02	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	5.32E-03	9.87E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	6.25E-03	1.29E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	5.66E-03	9.51E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	6.79E-03	1.39E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	3.81E-03	4.34E-03	2.E-04	2.E-04	2.E-05	2.E-05
Chrysene	see HMW PAHs	see HMW PAHs	6.31E-03	1.16E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	2.47E-03	2.47E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	6.94E-03	1.42E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	4.52E-03	9.71E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	4.18E-03	6.84E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	9.48E-03	1.57E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	7.97E-03	1.06E-02	2.E-03	2.E-03	2.E-04	2.E-04
High Molecular Weight PAHs	1	10	5.37E-02	9.99E-02	5.E-02	1.E-01	5.E-03	1.E-02
Acetone	10	50	1.89E-02	4.16E-02	2.E-03	4.E-03	4.E-04	8.E-04
2-Butanone	1771	4571	5.18E-03	2.00E-02	3.E-06	1.E-05	1.E-06	4.E-06
Toluene	26	260	1.07E-03	4.32E-03	4.E-05	2.E-04	4.E-06	2.E-05
				<b>TOTAL ESQS</b>	<b>3.5E+01</b>	<b>4.8E+01</b>	<b>4.E+00</b>	<b>5.E+00</b>

**Table 45. Meadow Vole Risk from Landfill Wet Meadow/Seeps**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	2.98E-08	8.75E-08	3.E-02	9.E-02	3.E-03	9.E-03
Aluminum	1.93	19.3	8.26E+01	1.10E+02	4.3E+01	5.7E+01	4.E+00	6.E+00
Antimony	0.143	1.43	1.15E-02	1.85E-02	8.E-02	1.E-01	8.E-03	1.E-02
Arsenic	4.6	9.3	4.96E-02	1.39E-01	1.E-02	3.E-02	5.E-03	1.E-02
Barium	5.1	-	8.64E-01	1.48E+00	2.E-01	3.E-01	-	-
Beryllium	0.66	-	3.26E-03	5.35E-03	5.E-03	8.E-03	-	-
Cadmium	1	10	9.23E-03	2.02E-02	9.E-03	2.E-02	9.E-04	2.E-03
Chromium	2737	-	1.87E-01	4.14E-01	7.E-05	2.E-04	-	-
Cobalt	-	-	1.10E-01	1.65E-01	-	-	-	-
Copper	11.7	15.14	6.77E-01	1.00E+00	6.E-02	9.E-02	4.E-02	7.E-02
Cyanide	24	-	3.05E-03	8.40E-03	1.E-04	4.E-04	-	-
Iron	-	-	2.10E+02	3.50E+02	-	-	-	-
Lead	8	80	2.30E-01	3.13E-01	3.E-02	4.E-02	3.E-03	4.E-03
Manganese	88	284	1.81E+01	4.74E+01	2.E-01	5.E-01	6.E-02	2.E-01
Mercury	13.2	-	1.07E-02	4.31E-02	8.E-04	3.E-03	-	-
Nickel	53.5	107	2.24E-01	3.28E-01	4.E-03	6.E-03	2.E-03	3.E-03
Selenium	0.2	0.33	7.65E-03	2.13E-02	4.E-02	1.E-01	2.E-02	6.E-02
Silver	0.375	3.75	6.19E-03	1.48E-02	2.E-02	4.E-02	2.E-03	4.E-03
Thallium	0.0131	-	9.39E-04	9.39E-04	7.E-02	7.E-02	-	-
Vanadium	0.5	5	1.05E-01	1.45E-01	2.E-01	3.E-01	2.E-02	3.E-02
Zinc	200	410	5.36E+00	8.36E+00	3.E-02	4.E-02	1.E-02	2.E-02
4,4'-DDE	1	-	2.77E-05	4.94E-05	3.E-05	5.E-05	-	-
alpha-Chlordane	4.6	9.2	1.31E-05	1.60E-05	3.E-06	3.E-06	1.E-06	2.E-06
Dieldrin	0.02	0.2	4.83E-05	5.66E-05	2.E-03	3.E-03	2.E-04	3.E-04
Endrin	0.092	0.92	2.14E-05	2.18E-05	2.E-04	2.E-04	2.E-05	2.E-05
gamma-BHC	8	-	1.40E-05	1.40E-05	2.E-06	2.E-06	-	-
gamma-Chlordane	4.6	9.2	1.19E-05	1.95E-05	3.E-06	4.E-06	1.E-06	2.E-06
4-Methylphenol	219.2	-	4.28E-02	1.32E-01	2.E-04	6.E-04	-	-
Benzaldehyde	0.47	-	6.97E-02	1.22E-01	1.E-01	3.E-01	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	8.53E-04	8.53E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	9.70E-04	9.70E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	9.70E-04	9.70E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	5.78E-04	5.78E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	8.37E-04	8.37E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs

**Table 45. Meadow Vole Risk from Landfill Wet Meadow/Seeps**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Bis(2-ethylhexyl)phthalate	18.3	183.3	2.18E-03	3.91E-03	1.E-04	2.E-04	1.E-05	2.E-05
Chrysene	see HMW PAHs	see HMW PAHs	1.01E-03	1.01E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	1.45E-03	1.45E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	6.11E-04	6.11E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	8.96E-04	8.96E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	1.82E-03	1.98E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	8.96E-04	8.96E-04	2.E-04	2.E-04	2.E-05	2.E-05
High Molecular Weight PAHs	1	10	1.00E-02	1.02E-02	1.E-02	1.E-02	1.E-03	1.E-03
<b>TOTAL ESQS</b>					4.4E+01	5.9E+01	4.E+00	6.E+00

### American Woodcock

Risks to the woodcock from detected COC concentrations in wet meadow/seep surface soils and surface water and from estimated concentrations in vegetation and invertebrates are presented in Table 46. The total mean ESQs for the NOAEL and LOAEL TRVs are 8 and 1, respectively. Mean and maximum ESQs for LOAEL TRVs do not exceed unity for any COC. Mean ESQs for chronic NOAEL TRVs are greater than unity for aluminum (ESQ is 3), lead (ESQ is 1) and zinc (ESQ is 2).

The mean concentrations of aluminum, lead and zinc within the reference wetland surface soil samples are greater than detected within the wet meadow and seep surface soils. In addition, maximum concentrations of these inorganics are comparable between the reference area and the wet meadow/seep area. Therefore, risks from detected concentrations of these COCs are not anticipated to be significantly greater than background risk.

### Short-tailed Shrew

Risks to the shrew from detected COC concentrations in wetland/seep surface soils and from estimated concentrations in vegetation and invertebrates are presented in Table 47. The total mean ESQs for the NOAEL and LOAEL TRVs are 350 and 37, respectively. Mean ESQs for LOAEL TRVs exceed unity for aluminum (ESQ is 34) and copper (ESQ is 1). Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxins (ESQ is 2), aluminum (ESQ is 340), copper (ESQ is 2), silver (ESQ is 1), thallium (ESQ is 1) and vanadium (ESQ is 2).

The mean concentrations of aluminum, copper and vanadium within the reference wetland surface soil samples are greater than detected within the wet meadow/seep surface soils. Therefore, risks from mean concentrations of these COCs are no greater than background risk. Although the surface soil concentrations of dioxins, silver and thallium at the wet meadow/seep area are elevated above the detected concentrations within the reference wetland, the slight exceedences of the chronic NOAEL TRV by silver and thallium and non-exceedence of the LOAEL TRV by silver and dioxin (a thallium LOAEL is unavailable) indicate that risks are not significantly elevated to insectivorous mammals foraging within the wet meadow/seep areas.

## **4.5 Uncertainty Analysis**

This section summarizes the major uncertainties in the ecological risk assessment and discusses their impacts on the study's results. In some cases the uncertainties presented were discussed in detail in previous sections of the assessment and are only referred to in this section.

The uncertainty associated with exposure assessment involves the modeling of COC uptake into invertebrates and subsequently into the selected indicator species. The models and parameters selected introduce a conservative bias due to the selection of indicator species and dietary composition that maximize the potential for exposure. The equation used to estimate organic constituents of concern with invertebrates has been empirically-derived and validated for

**Table 46. Woodcock Risk from Landfill Wet Meadow/Seeps**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.11E-06	2.59E-06	1.E-01	2.E-01	1.E-02	2.E-02
Aluminum	109.7	-	2.85E+02	3.81E+02	3.E+00	3.E+00	-	-
Antimony	-	-	6.51E-02	8.52E-02	-	-	-	-
Arsenic	2.46	7.38	2.85E-01	7.98E-01	1.E-01	3.E-01	4.E-02	1.E-01
Barium	20.8	41.7	2.02E+00	3.47E+00	1.E-01	2.E-01	5.E-02	8.E-02
Beryllium	-	-	2.94E-02	4.82E-02	-	-	-	-
Cadmium	1.4	14	1.34E-01	2.94E-01	1.E-01	2.E-01	1.E-02	2.E-02
Chromium	1	5	9.86E-01	2.18E+00	1.E+00	2.E+00	2.E-01	4.E-01
Cobalt	-	-	4.56E-01	6.81E-01	-	-	-	-
Copper	47	61.7	8.24E+00	1.22E+01	2.E-01	3.E-01	1.E-01	2.E-01
Cyanide	0.04	-	8.73E-03	2.40E-02	2.E-01	6.E-01	-	-
Iron	-	-	6.80E+02	1.13E+03	-	-	-	-
Lead	1.13	11.3	1.21E+00	1.64E+00	1.E+00	1.E+00	1.E-01	1.E-01
Manganese	977	-	3.23E+01	8.47E+01	3.E-02	9.E-02	-	-
Mercury	0.45	0.9	4.34E-02	1.75E-01	1.E-01	4.E-01	5.E-02	2.E-01
Nickel	77.4	107	2.82E+00	4.13E+00	4.E-02	5.E-02	3.E-02	4.E-02
Selenium	0.5	1	7.14E-02	1.99E-01	1.E-01	4.E-01	7.E-02	2.E-01
Silver	178	-	2.07E-01	4.94E-01	1.E-03	3.E-03	-	-
Thallium	0.35	-	7.76E-03	7.76E-03	2.E-02	2.E-02	-	-
Vanadium	1.5	2.2	3.31E-01	4.56E-01	2.E-01	3.E-01	2.E-01	2.E-01
Zinc	14.5	131	3.39E+01	5.28E+01	2.E+00	4.E+00	3.E-01	4.E-01
4,4'-DDE	0.845	-	6.63E-04	1.18E-03	8.E-04	1.E-03	-	-
alpha-Chlordane	2.14	10.7	2.52E-04	3.08E-04	1.E-04	1.E-04	2.E-05	3.E-05
Dieldrin	0.077	-	2.73E-04	3.20E-04	4.E-03	4.E-03	-	-
Endrin	0.01	0.1	3.52E-04	3.59E-04	4.E-02	4.E-02	4.E-03	4.E-03
gamma-BHC	2	20	1.12E-04	1.12E-04	6.E-05	6.E-05	6.E-06	6.E-06
gamma-Chlordane	2.14	10.7	3.04E-04	4.96E-04	1.E-04	2.E-04	3.E-05	5.E-05
4-Methylphenol	-	-	3.92E-02	1.21E-01	-	-	-	-
Benzaldehyde	-	-	3.63E-02	6.34E-02	-	-	-	-
Benzo(a)anthracene	-	-	1.51E-02	1.51E-02	-	-	-	-
Benzo(a)pyrene	-	-	1.93E-02	1.93E-02	-	-	-	-
Benzo(b)fluoranthene	-	-	1.93E-02	1.93E-02	-	-	-	-
Benzo(g,h,i)perylene	-	-	1.26E-02	1.26E-02	-	-	-	-
Benzo(k)fluoranthene	-	-	1.66E-02	1.66E-02	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	1.84E-02	3.30E-02	2.E-02	3.E-02	-	-

**Table 46. Woodcock Risk from Landfill Wet Meadow/Seeps**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Chrysene	-	-	1.79E-02	1.79E-02	-	-	-	-
Fluoranthene	-	-	2.04E-02	2.04E-02	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	1.35E-02	1.35E-02	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	1.02E-02	1.02E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	2.54E-02	2.76E-02	-	-	-	-
Low Molecular Weight PAHs	40	400	1.02E-02	1.02E-02	3.E-04	3.E-04	3.E-05	3.E-05
<b>TOTAL ESQS</b>					8.E+00	1.4E+01	1.E+00	2.E+00



**Table 47. Short-tailed Shrew Risk – Landfill Wet Meadow/Seeps**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.84E-06	5.97E-06	2.E+00	6.E+00	2.E-01	6.E-01
Aluminum	1.93	19.3	6.54E+02	8.74E+02	3.4E+02	4.5E+02	3.4E+01	4.5E+01
Antimony	0.143	1.43	6.74E-02	2.12E-01	5.E-01	1.E+00	5.E-02	1.E-01
Arsenic	4.6	9.3	6.99E-01	1.96E+00	2.E-01	4.E-01	8.E-02	2.E-01
Barium	5.1	-	4.71E+00	8.07E+00	9.E-01	2.E+00	-	-
Beryllium	0.66	-	7.35E-02	1.20E-01	1.E-01	2.E-01	-	-
Cadmium	1	10	3.49E-01	7.63E-01	3.E-01	8.E-01	3.E-02	8.E-02
Chromium	2737	-	2.38E+00	5.27E+00	9.E-04	2.E-03	-	-
Cobalt	-	-	1.08E+00	1.61E+00	-	-	-	-
Copper	11.7	15.14	2.13E+01	3.16E+01	2.E+00	3.E+00	1.E+00	2.E+00
Cyanide	24	-	1.94E-02	5.33E-02	8.E-04	2.E-03	-	-
Iron	-	-	1.55E+03	2.57E+03	-	-	-	-
Lead	8	80	2.94E+00	4.00E+00	4.E-01	5.E-01	4.E-02	5.E-02
Manganese	88	284	7.50E+01	1.97E+02	9.E-01	2.E+00	3.E-01	7.E-01
Mercury	13.2	-	1.12E-01	4.51E-01	8.E-03	3.E-02	-	-
Nickel	53.5	107	7.20E+00	1.05E+01	1.E-01	2.E-01	7.E-02	1.E-01
Selenium	0.2	0.33	1.79E-01	4.99E-01	9.E-01	2.E+00	5.E-01	2.E+00
Silver	0.375	3.75	5.40E-01	1.29E+00	1.E+00	3.E+00	1.E-01	3.E-01
Thallium	0.0131	-	1.93E-02	1.93E-02	1.E+00	1.E+00	-	-
Vanadium	0.5	5	7.55E-01	1.04E+00	2.E+00	2.E+00	2.E-01	2.E-01
Zinc	200	410	8.83E+01	1.38E+02	4.E-01	7.E-01	2.E-01	3.E-01
4,4'-DDE	1	-	1.71E-03	3.04E-03	2.E-03	3.E-03	-	-
alpha-Chlordane	4.6	9.2	6.46E-04	7.91E-04	1.E-04	2.E-04	7.E-05	9.E-05
Dieldrin	0.02	0.2	6.96E-04	8.14E-04	3.E-02	4.E-02	3.E-03	4.E-03
Endrin	0.092	0.92	9.01E-04	9.18E-04	1.E-02	1.E-02	1.E-03	1.E-03
gamma-BHC	8	-	2.84E-04	2.84E-04	4.E-05	4.E-05	-	-
gamma-Chlordane	4.6	9.2	7.83E-04	1.28E-03	2.E-04	3.E-04	9.E-05	1.E-04
4-Methylphenol	219.2	-	1.01E-01	3.12E-01	5.E-04	1.E-03	-	-
Benzaldehyde	0.47	-	9.56E-02	1.67E-01	2.E-01	4.E-01	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	3.87E-02	3.87E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	4.94E-02	4.94E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	4.94E-02	4.94E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	3.24E-02	3.24E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	4.27E-02	4.27E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	4.69E-02	8.40E-02	3.E-03	5.E-03	3.E-04	5.E-04

**Table 47. Short-tailed Shrew Risk – Landfill Wet Meadow/Seeps**

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Chrysene	see HMW PAHs	see HMW PAHs	4.59E-02	4.59E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluoranthene	see HMW PAHs	see HMW PAHs	5.21E-02	5.21E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	3.47E-02	3.47E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Phenanthrene	see LMW PAHs	see LMW PAHs	2.60E-02	2.60E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	6.50E-02	7.05E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	2.60E-02	2.60E-02	5.E-03	5.E-03	5.E-04	5.E-04
High Molecular Weight PAHs	1	10	4.36E-01	4.42E-01	4.E-01	4.E-01	4.E-02	4.E-02
				<b>TOTAL ESQS</b>	3.5E+02	4.8E+02	3.7E+01	5.2E+01

oligochaete and earthworm accumulation of chlorinated organic constituents (e.g., PCBs, DDT) from benthic sediments or soils under steady state conditions (Menzie, 1992; Markwell et al., 1989). The applicability of this equation for estimating PAH or dioxin/furan concentrations introduces uncertainty.

Additional uncertainty is introduced by assuming insects (both aquatic and terrestrial) ingested by the little brown bat, spotted sandpiper, and short-tailed shrew receive the same degree of sediment or soil exposure as earthworms or oligochaetes. Worms (both terrestrial and aquatic) are more likely to accumulate COCs contained within sediment and soil because they generally have a higher contact rate with these media than do insects. This has been shown to occur in studies of metals accumulation in biota which show substantially lower concentrations in insects relative to earthworms (Beyer et al., 1985). These considerations indicate that the modeled uptake of COCs into the insectivorous indicator species diets represents a conservative (upper bound) estimate.

Another conservative feature of the exposure assessment includes the assumption that 100 percent of the ingested COCs (including consumption of soil/sediment) is bioavailable. It is likely that a portion of the COCs ingested is not bioavailable to the indicator species and would result in an overestimation of the exposure dose received.

One of the main uncertainties of the assessment is associated with the toxicity values for the indicator species. A considerable number of the COCs for avian indicator species do not have an associated toxicity value. Therefore, an evaluation of these COCs to provide risk to the indicator species could not be provided. For avian species this would result in an underestimation of the total risk for that measurement receptor. For example, no avian toxicity value was found in the literature for high molecular weight PAHs. Therefore, it is unclear whether detected concentrations of these contaminants within site sediments and surface soils may present a risk to avian species inhabiting the site. Amphibian larvae were evaluated via acute surface water TRVs. Many of the reported amphibian larvae toxicity studies are associated with lethal effects (i.e., LC-50s). Although the reported LC-50 values were occasionally less than the reported LOAELs from other studies, nevertheless, the evaluation of amphibian larvae impacts using acute data may underestimate chronic non-lethal effects for some COCs.

The TRVs for the wildlife measurement receptors were generally extrapolated from laboratory studies conducted on laboratory animals (particularly for the mammalian toxicity data). There is uncertainty associated with applying these laboratory studies to the selected indicator species.

The chronic NOAEL high molecular weight PAH toxicity value for mammalian species was derived by applying an uncertainty factor of 10 to the LOAEL toxicity value. The LOAEL toxicity value is associated with uncertainty due to the study design (e.g., doses selected and endpoints) and applying an uncertainty factor of an order of magnitude only exacerbates this uncertainty.